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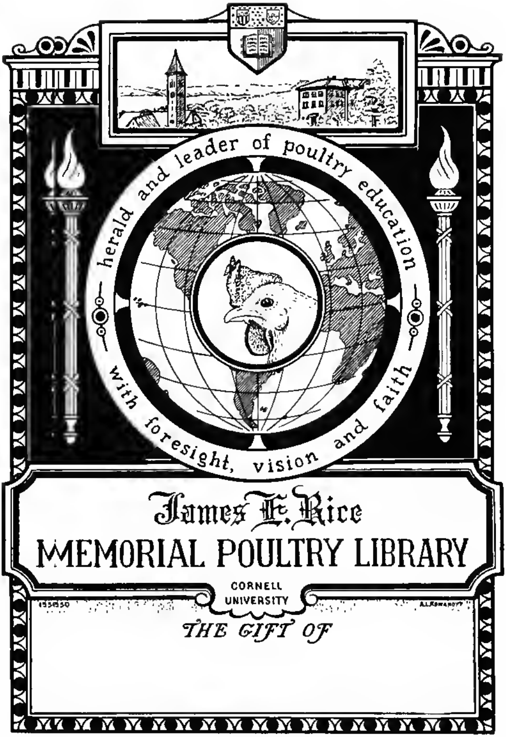
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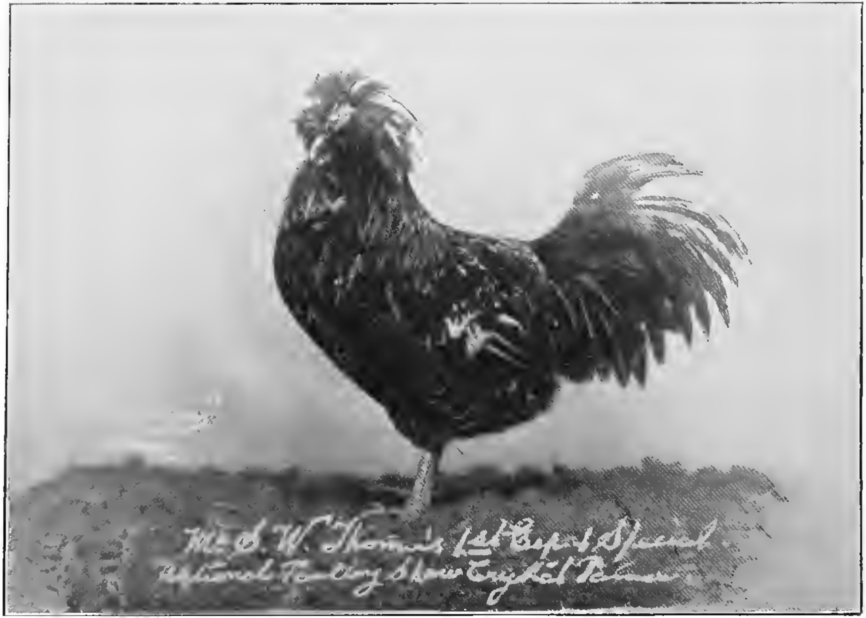
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ARTHUR T. JOHNSON

AUTHOR OF 'FOWLS FOR PROFIT,' 'REARING AND INCUBATION,'
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Published 1910

CONTENTS

CHAP. PAGE

I POULTRY-FARMING 1

II EGGS AND TABLE FOWLS 10

III THE EVOLUTION OF A CHICKEN 18

IV SOME TYPES OF INCUBATORS 26

V ARTIFICIAL INCUBATION 34

VI ARTIFICIAL REARING 43

VII HATCHING AND REARING WITH THE HEN . . 56

VIII HALF-FLEDGED CHICKENS 62

IX THE FARMER'S FOWLS 70

X HOUSES AND RUNS 80

XI FOODS AND THEIR USES 89

XII WHEN AND HOW TO FEED LAYING HENS . . 100

XIII POULTRY FOR THE TABLE 108

XIV DUCKS 121

XV BREEDS OF POULTRY 132

XVI DISEASES OF POULTRY 147

SOME USEFUL NOTES 164

GLOSSARY OF TECHNICAL TERMS USED BY POULTRY KEEPERS 171

INDEX TO ILLUSTRATIONS 177

" " SUBJECTS 178

THE POULTRY KEEPER'S COMPANION

CHAPTER I

POULTRY-FARMING

Theory and Practice

IF we were to look back on the past fifteen years and take a passing glance at the phases through which poultry-farming has passed during that period, we should find that the vicissitudes of its progress have been punctuated more by disaster than success. It is scarcely necessary to disinter the sad memory of lost capital and—in some cases—wrecked lives, so as to impress upon the beginner to-day the useful, if severe, lessons of the past. It will be enough for our purpose here to know thát the old "poultry-farming," which sent people crazy and led them like a "Will-o'-the-wisp" to certain doom, has had its day.

POULTRY-FARMING AS A SOLE PURSUIT.—The system, or rather the belief, that money could be made by keeping poultry on a large scale, on land hired expressly for that purpose, has been found utterly false, and volumes might be filled with the details of how people have lost their all in rash enterprises of this kind. But not one single instance of a poultry farm of a purely utility kind having succeeded for more than two or three years at the most can be recalled. As a sole industry entirely dependent upon its own resources, it has never paid and never will. Practical men, although, perhaps, they themselves were in earlier years duped by this visionary road to fortune, wonder now why any one ever thought it could succeed. Time and experience have brought home to them the lesson that utility poultry, which, under proper conditions, can be made very profitable, is, alone, not enough to depend upon for a living, and that it would be just as reasonable to expect a gardener to live by producing cabbages only as it would be to believe in the possibility of making fowls—which are one of the branches of the agricultural tree and not a tree unto themselves—kept in large numbers, a lucrative stock.

AN ADJUNCT TO AGRICULTURE.—In all departments of rural work it has been found essential to combine one industry with another, and poultry cannot be isolated and remain profitable, any more than other animals. The ideal holding is, to my mind, a place where each department helps the other. Thus we find that while poultry are of incalculable service to the agriculturist in ridding the land of injurious insect pests, moss and weed, a generous return is made, not only in eggs, or flesh, but in manure, which is a highly concentrated plant food of great value. Therefore I hope to be able to show that poultry are, to the general farmer and gardener, most useful allies and, perhaps, his most profitable stock, no matter how unprofitable they may be when run alone.

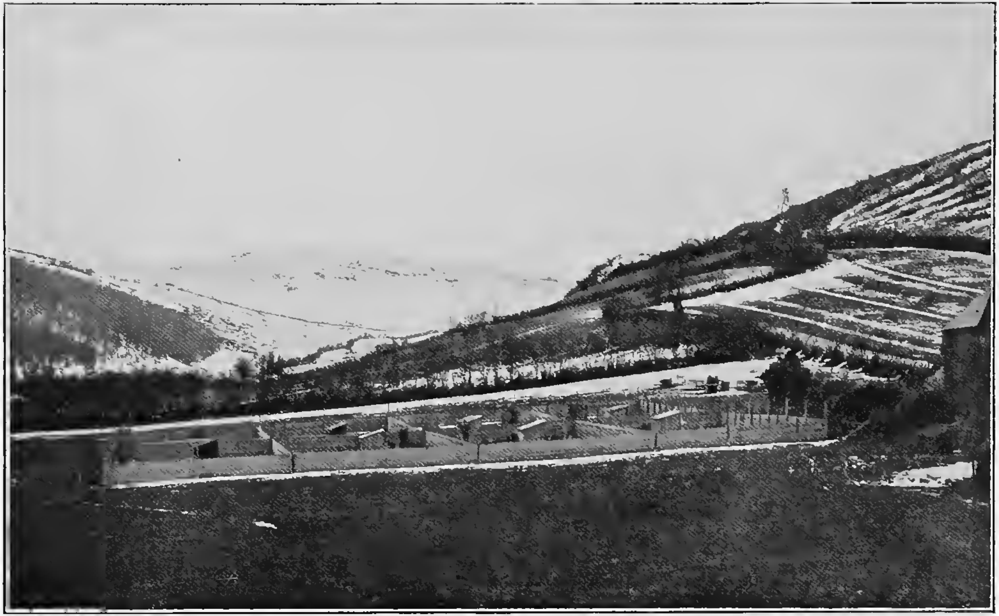
But, it may be asked, if poultry farms are such undesirable undertakings, how is it that there are so many in existence in the country to-day? These establishments are not poultry farms in the ordinary sense of the term. They are places where stock for exhibition or breeding purposes are produced and where "market prices" are unknown. The men who succeed with these farms are specialists in their own particular line, they have peculiar qualifications which fit them for the work, their establishments have been enormously capitalized, and they do not produce eggs and chickens for market—in a word, they are not poultry farmers. Some of these breeders also combine a poultry medicine, food and appliance business with their work, and many of them have private means, or some other source of income, quite apart from that accruing from the farm. The beginner, therefore, must not for a moment think that all poultry farms are places where birds are easily produced at £5 apiece, as a daily halfpenny press is so fond of reminding us, and he must not aspire to such things unless he is specially qualified

[By the courtesy of "The Illustrated Poultry Record"

A SMALL HOLDER'S POULTRY YARD

to do so. There is, of course, not the slightest reason why a utility poultry keeper should not indulge in breeding fancy poultry for profit as a branch of his work, and this subject will be touched upon later. But my main object here is to afford an insight into how to make purely utility poultry pay. The poultry keeper may have a large farm, a small holding, or merely a garden run, but, in any case, if he goes the right way about it, he can make his stock profitable, whether it is the principal object of his endeavours or only quite a secondary adjunct on the land.

NECESSITY FOR PRACTICAL EXPERIENCE.—Before going in for profitable poultry-keeping as a business, the first essential is a thorough practical knowledge of the work. Many people seem to be possessed of the erroneous idea that there is not very much to learn about poultry, while, as a matter of fact, feathered stock demands perhaps more experience than any other kind before it can be made profitable. I have had a tolerably deep insight into the various sections of agricultural work, and as yet have failed to discover any which are more fraught with difficulties than that pertaining to poultry if it is to be conducted profitably. Of course, it is easy to "muddle along" with a flock of hens about the place, but that is not the point. If hens are to be made lucrative, their owner must be properly equipped with the essential knowledge of their peculiar wants, habits and temperaments, as well as with a business capability of no mean kind. If the ablest and most experienced poultry breeders to-day will admit, as they do, that, like Socrates, they "grow old learning," how absolutely necessary it must be for the beginner to be backed up by sound practical knowledge, gained not only by reading but by hard work. An apprenticeship is an acknowledged necessity in every other walk of life, and



View of Portion of the Rev. Lewis Jones' Prize Poultry Farm at Heyope, Knighton

Note the Wind-breaks round the Pens

there is not the slightest reason why people should ever have imagined that poultry-keeping was exempt from that preliminary. When only a few birds are kept it is, of course, another matter. But whenever capital is involved, wherever poultry are kept as a means of adding to one's income, then it is impossible to urge the necessity for genuine training too emphatically. Where and how this training is to be attained must depend largely upon circumstances. If the fowls are to be a secondary part of one's scheme, six months' pupilage on a farm where the feathered stock is made a distinct feature will sometimes suffice. But when a more important undertaking is in view nothing short of eighteen months' to two years' practical work will serve the purpose. And as most poultry farmers make specialities of one branch of work or another—and the several other departments of the whole undertaking may differ very widely—the beginner would naturally choose a place upon which is conducted a business on the lines which he himself intends to adopt. For example, it would not be wise to go and attempt to learn egg-production on an establishment where fattening is the principal object, neither would it be reasonable to expect to learn the cut-flower trade, as an adjunct to poultry-keeping, where fruit-growing is the main pursuit. This point is an important one which must not be lost sight of by the beginner.

CAPITAL REQUIRED.—It is hardly possible to speak definitely upon the amount of capital that is needed for successful poultry-farming, because scarcely two people conduct their businesses on the same scale or principle, and everything depends upon whether the poultry are expected to yield the main part, or only quite a secondary portion of one's income. But poultry-farming is not, even when on quite a moderate scale, an industry for a meagre capital—or none at all, as some enthusiasts have, in the

On Mr. T. W. Toovey's Duck Farm, King's Langley past, supposed. A beginner, who knows what he is about, can very easily dispose of £100 in stock and appliances, and not have very much to show for it, and, speaking broadly, I would fix the minimum amount at double that figure if part of one's living is to be derived from the undertaking, and supposing the poultry to be the chief, but not the only, section of the work. Smaller ventures, such as in the case of a farmer or gardener who desires to make his poultry a lucrative branch and nothing more, would naturally take considerably less. But whenever the concern involves a considerable amount of capital, and this is limited, it is always wise to bank a reserve fund. Many a beginner has had to suffer collapse for the want of a little financial help at the end of his second year, which is usually the turning point for good or ill. Therefore, I would strongly recommend that about one-third of the available cash be reserved "for a rainy day." It may mean, as it often has done, the very salvation of an establishment that would otherwise cease to be. And it must ever be remembered by the would-be poultry farmer that he must not expect to live upon the proceeds of his concern for at least two years from the time of starting. During that period he must put back into his business all profits—after paying all legitimate expenses—that accrue. If he dabbles with proceeds, using them for personal needs, he is draining the undertaking of the very sap of life, and ultimate success will be prolonged, if not killed outright. The necessity, therefore, for some other source of revenue for one's maintenance during the first few years is obvious.

There is one more point that must be touched upon under this heading, and that is the necessity for a proper system of book-keeping. No matter how small and apparently insignificant one's business may appear to be, without it real progress is impossible. The simpler the plan of keeping accounts is the better, provided it is plain and comprehensive. A capital account and a daily statement of receipts and expenditure, balanced up at regular intervals, will cover most requirements dealing with actual £ s. d., and for convenience the book may be arranged to keep the numerous other necessary records relating to incubation, addresses of customers, ages of stock, etc.

Finally, I would warn the enthusiastic beginner that poultry-farming is not a life for the easy-going and the indolent. It demands an amount of hard work, early and late, wet or fine, week in and week out, that few who have not tried it can realize. A sixteen-hours' day, and few, if any, holidays, is the poultry farmer's lot in spring and summer, and "the daily round, the common task," is often monotonous enough to try the zeal of the best of us. Of course, it has its bright sides also. Much of the work is intensely interesting to those who are fond of it (as they must be if they are to succeed). The open air and the country life compensate one for many of the troubles and anxieties which must always, at times, beset the way, and a substantial reward awaits the honest worker who has conducted his business under possible conditions.

CHAPTER II

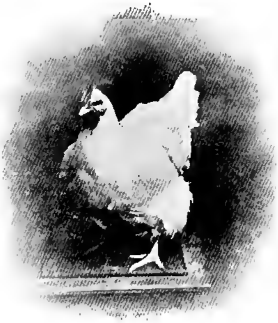
EGGS AND TABLE FOWLS

Some Commercial Aspects.

As it is not my intention here to take more than a superficial glance at the condition of the poultry trade, as it stands to-day, I do not consider that any good purpose will be served by quoting trade returns and occupying space with long rows of statistical figures which, however useful and essential they may be to some, are just as well omitted from a book of this kind. The main object of this chapter is briefly to show the poultry farmer how he stands in relation to foreign imports, and to indicate what prospects he has of success.

Of the two main branches of poultry-farming, viz. the production of eggs and fowls for table, the former undoubtedly affords the greater encouragement. The very fact that the demand for genuine " new laids " is constantly growing, accompanied by a steady increase in price, taking the country generally, is, in itself, sufficient proof that there is ample scope for egg-production on a far more extensive scale than we have ever yet dreamed of. And so long as the public maintains a greater appreciation for home produce, by being ready to pay more for it—provided it is of the right quality—than for the foreign article, the enormous importation of the latter need not be the dreadful thing many people suppose it to be.

THE FOREIGN EGG.—It is the custom of an irresponsible and ignorant lay press to be for ever dangling before the eyes of readers, who are equally foolish, the awful fact that some six or seven million pounds are annually paid by this country to the foreigner for eggs alone. Why not keep all this "British gold in British pockets?" is the cry. And forthwith a "Back-to-the-Land" pilgrimage is stimulated, with the result that numbers of men and women, full of the best intentions in the world, go into the country with the object of rescuing some of that exported gold. These people are generally hopelessly inefficient, and the result is that in a few years, or a few months, they are obliged to return to some other occupation, their hard-earned savings lost, and their castles in the air shattered like a house of cards. I do not want to discourage any genuine "Back-to-the-Land" movement which affords some promise of success, but when people who are equipped with nothing more than a misdirected enthusiasm, inflated with the sensational articles of some fatuous newspaper, become possessed with such notions as



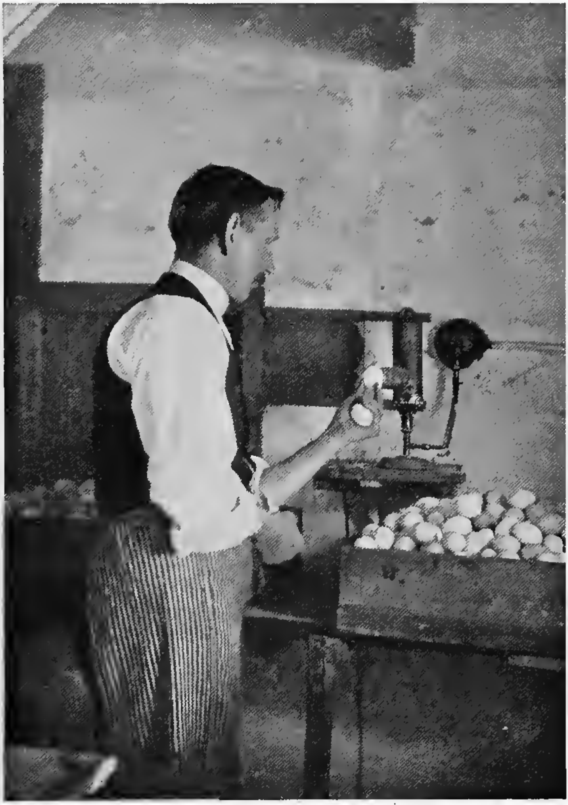
A Popular All-round Breed

Typical White Orpington Hen, Winner of Many Prizes

The property of Messrs. Whitaker and Tootill

I have indicated above, the kindest attitude to adopt is one of the "wet blanket" description.

The foreign egg has really very little to do with that of home production. Provided our own eggs pass the test of quality there are no others in the world which can compete with them on the market. But if English eggs do not maintain a high standard of excellence it is their own fault, or that of our poultry keepers, if they clash with the foreign article, which is, in such an instance, often superior. It is true that imported eggs are sometimes mixed with our own and sold as "country eggs" by unscrupulous rogues, and that some other base practices of that kind seriously affect the home trade, but, on the whole, eggs of first quality from abroad cannot reach our best markets. When they do compete with us it is merely a proof that our own supplies are wanting in one way or another. Furthermore, we should not forget that the foreign egg—even of the worst possible description—has its uses which ours cannot fill. We must, for example, have cheap albumen in enormous quantities to supply the needs of bookbinders, kid finishers, calico-printing, photography, confectionery and numerous other trades; and where is the poultry keeper in this country who would be willing to supply the millions of eggs needful for these commercial purposes at five or six shillings, or even less, a hundred? If the market for our own "new laids" was not a tolerably good one, and with every promise of growing better, the producer might, possibly, invent some ground for complaint against the foreign supply, but, as matters stand at present, he holds the best prices and the best market in the hollow of his hand. He must not, however, be too sure of this monopoly, for the day may not be far distant when Denmark, or France, or Ireland may be able to flood our markets with eggs equal in quality to our very best, when any prejudice that may exist in the consumer's mind in favour of home supplies will be forgotten, with the inevitable result that prices would decrease, and our market, as it is to-day, would be lost.



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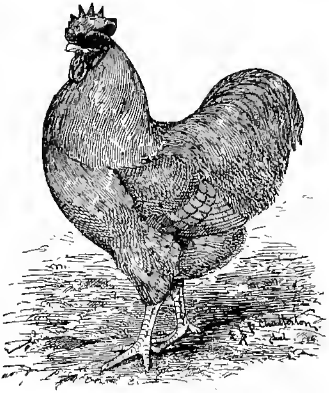
TESTING EGGS FOR FRESHNESS

LESSONS FROM ABROAD.—The home producer is often apt to think that he has nothing to learn from the importer, but as a matter of fact he has a very great deal. Not only does the foreigner teach us many lessons in methods of collecting the produce, co-operation among farmers, grading and packing—all of the utmost importance—but he has won the confidence of our market salesmen by his reliability. Foreign supplies are more to be depended upon than our own, and it is the too casual methods of business, the irregular supply and mixed quality of our country consignments that have so often disappointed the salesman, retailer, and consumer.

In summing up the whole aspect of the egg trade, which I have but briefly passed over, one cannot but be convinced that there never was a better time for egg-producers than the present. The egg, as an article of food, is in far greater demand than it ever was before, even in country districts, the increase in that demand being out of all proportion to the increase in the population. The country now produces ten, perhaps twenty, times as many as it has ever hitherto done, the foreigner sends increasing millions of pounds' worth to us every, year and yet the demand for *genuine new laid eggs* is greater than ever, and the price is steadily increasing. Need one say more? That there are difficulties to be overcome in many districts I do not deny. We want more co-operation all over the country on some such lines as those adopted by the National Poultry Organisation Society or the Irish Agricultural Organisation Society, which latter has done such incalculable service for the poultry keepers of the sister isle. With the establishment of such institutions would come a wider discrimination of knowledge and cheaper means of transit for the produce. And lastly—but by no means least—we want at least a fair proportion of that State aid that is annually granted to other departments of agriculture, and, Heaven knows, that is little enough in this country!

TABLE POULTRY.—If we take a general view of the trade in table poultry as we find it to-day, the feature which stands out most prominently is the wide variation in the quality of the home production, and the ever-increasing influx of cold-storage supplies. The Surrey and Sussex chickens, or fowls, which, for the most part, are fattened, if not reared, in the districts south-east of London, are probably as fine as any in the world. They are the products of a system of fattening which is in the hands of skilled feeders, and they naturally command the best London prices. But in the provinces matters are very different. There fattening, as practised in the south-eastern counties, is practically unknown, and the bulk of the chickens are marketed without being specially fed in any way. Supplies are wholly unreliable, grading is not given the attention it deserves, and the final preparation of the carcases, whether for the market or the consumer direct, is anything but satisfactory.



[By the courtesy of Mr. C. H. Bradley

A Useful Table Breed

Buff Orpington Cock

The advantages of fattening poultry, though fully acknowledged in the case of other live stock, have never yet been given due consideration either by producers or consumers. The latter may complain if he has a chicken to carve which is little better than skin and bone, but he does not always appreciate a well-fatted fowl if he has to pay about as much again for it as he did for the thin one. Yet the dearer bird, if of the right quality, is the cheaper of the two in the long run, from the fact that it carries so much more flesh in proportion to waste. But until the public taste undergoes a change, until it is educated to appreciate the better and more economical fowl, there cannot be much hope for progress. There is no doubt but that the producer, especially if he sells direct to private customers, may do a very great deal towards popularizing fattened poultry, just as he might by introducing such specialities as *petits poussins* to people who have never heard of them before, and thus creating a new demand.

It is much the same with table poultry as it is with eggs (only the latter are easier to sell, if good). The quality of the former is, taking it altogether, indifferent. Even allowing for the want of appreciation shown by the consumer towards a properly fattened and prepared fowl, there is an enormous field for improvement. Merely by adopting better breeds the farmer, or other rearer, would achieve much towards attaining a higher standard of quality—and a bird especially adapted for table need not necessarily cost any more to rear than an inferior specimen. Indeed, they generally cost less. With table-poultry, again, we find that the foreigner has stepped in to meet the requirements of the times where we have failed, but, as in the case of eggs, the frozen article cannot compare with our best qualities. That it is often better than, and even bought in preference to, our inferior specimens one must admit, but, speaking generally, the producer who markets good quality in a proper manner has no need to fear any foreign competitor. For that reason alone we should endeavour to raise the standard of our supplies all round, to make these supplies more regular, and to pay the same amount of attention to careful grading and packing as the foreign poultry keeper does. Co-operation and assistance from some such organizations as those already mentioned are in this department also sorely needed in outlying districts, to facilitate marketing and assist in maintaining uniformity in the supplies. But the poultry keeper must first learn to do for himself more than he has yet done, as a producer, for all the co-operation in the world will not make an indifferent fowl into a good one, nor turn apathy into industry.

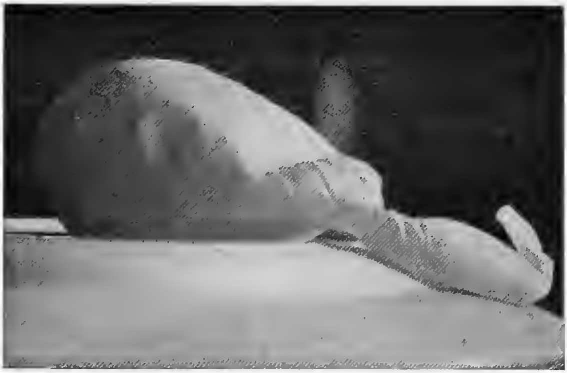
CHAPTER III

THE EVOLUTION OF A CHICKEN

HOW AN EGG IS MADE.—In this chapter it is not my intention to attempt to solve the time-honoured conundrum—" Which came first, the egg or the hen ?"—neither do I consider it desirable to go at all deeply into the scientific aspect of the chicken's development. But seeing that a clear understanding of the general structure of an egg, and of the various purposes which its parts fulfil, must form the basis of all practical work in the poultry yard, no apology is needed for beginning with the egg in the ovary of the mother and tracing its progress from thence until it becomes a perfect chicken.

OVARY.—Most people who have ever had anything to do with fowls are aware that if a laying hen, or one about to lay, were to be examined internally, there would be found attached to her back, or spine, a cluster of reddish-yellow, globular objects of sizes varying from about an inch in diameter to others of almost microscopic dimensions—the whole mass hanging somewhat like a bunch of grapes. As a matter of fact this cluster, or "ovary," as it is called, is none other than the fruit of the hen, and it bears the same relationship towards her as a capsule of seed, or bunch of fruit, does to the plant or tree which bears it. The process of development, however, in the two instances is somewhat different. When the seed is ripe, the plant, having endowed it with enough nourishment to give it a start in life, casts it away into the earth and takes no further heed of it. The bird deposits her egg—her seed—in a nest, but at that stage her duty towards it is scarcely begun, for, unlike the seed of the plant, it requires the continued warmth of her body for a certain period before the germ within it will become a chicken.

OVIDUCT.—When a hen is ready to lay, one of the globular bodies in the ovary—which are the yolks of the eggs she produces—breaks away from the bunch and enters the wide mouth of a long, whitish channel called the oviduct or egg-passage. It then begins to pass along the latter, secreting, as it goes, the albumen or "white." When that is completed the whole mass is enclosed in two membranes which, except at the larger end of the egg, where they separate and form the air cell, adhere to one another, forming a tough, parchment-like covering. Finally, the shell is formed, when the completed egg is expelled into the outer world. That, very briefly, is how an egg is formed and laid.



[*By the courtesy of "The Illustrated Poultry Record"*

AN ABNORMAL OR SOFT-SHELLED EGG

DOUBLE-YOKED OR SHELL-LESS EGGS.—With the above facts before him the reader can understand how, if two yolks become detached at the same time and enter the oviduct together, a double-yolked egg is the result. Such not infrequently happens in the case of very prolific hens. Or, again, supposing a hen to be over-stimulated by high feeding, she may produce eggs faster than the oviduct can shell them, the result being soft-shelled, or entirely shell-less eggs. In serious cases, when the egg-organs become deranged, if not diseased, yolks alone may be deposited.

STRUCTURE OF AN EGG.—We must now consider the uses of the various parts of an egg, for the uninitiated may be reminded that the latter was not designed by Nature for the food of man, but for the early home of the embryo chicken. Perhaps the best way to examine the structure of an egg is to break it into a saucer, taking care not to rupture the yolk. The shell, in the first place, is a hard covering, wonderfully strong for its thickness, composed of angular particles of limey material so arranged that air can pass in and out of the egg. This, as will presently be seen, is absolutely necessary for the life of the growing embryo within. At the larger end of the broken shell the air cell may generally be seen intact.

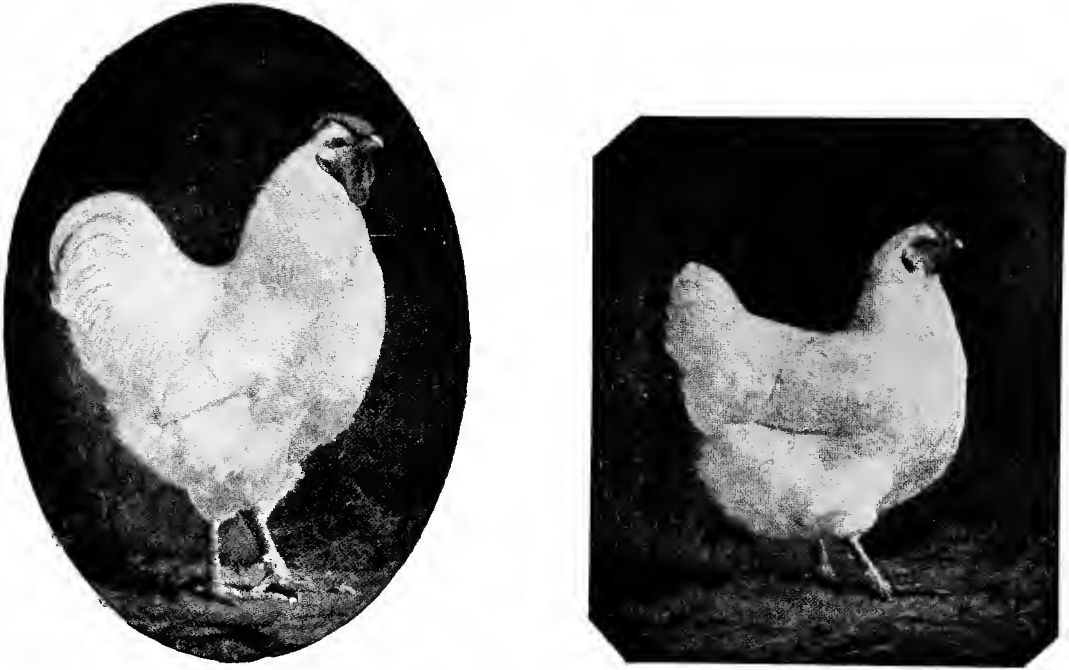
THE GERM SPOT.—Apart from the membrane already mentioned, the contents of the egg may be roughly considered to consist of three parts, viz. the germ spot, yolk, and albumen. The first, from which, in an egg undergoing incubation, the embryo begins to grow, is a very small disc, generally of lighter colour than the yolk, upon the top of which it rests. This germ spot will always be present in a fresh egg, whether the latter has been fertilized or not, but it is impossible to say without the aid of a microscope whether it will ever produce a living embryo.

YOLK AND ALBUMEN.—The yolk of an egg is, as every one knows, a globular yellowish-red substance, and its ultimate duty is to provide the growing embryo with nourishment, which is absorbed first from the yolk itself and lastly from the albumen, or "white." The latter, seeing that it forms so large a portion of an egg's contents, must be the principal material upon which the embryo is built up. Albumen is a highly concentrated form of nourishment and, though it is present in the seeds of plants (where it serves the same purpose as it does in an egg) and in most animal and vegetable substances to some extent, it is found in its purest and least adulterated form in the white of an egg.

CHALAZÆ.—On either side of the yolk, pointing towards the ends of the egg, are some whitish, stringy substances—often supposed by ignorant people to be the "germ." These are called chalazæ, and they are nothing more than thickened portions of albumen, whose duty is to hold the yolk in position. They are so placed that, no matter how much an egg may be turned round, the side of the yolk containing the germinal disc will be uppermost. By means of a most delicate adjustment the yolk is thus balanced in equilibrium, and so perfectly is this arranged that we might break a hundred eggs into a cup or basin and in every one of them the little disc will hold the same relative position on the top of the yolk. The reason for this wonderful contrivance will be understood later on. The albumen, as well as the chalazæ, apart from the functions already ascribed to them, are also of material advantage to the egg in acting as buffers to protect the delicate yolk and germ from the effect of possible concussion. Thus we find that an egg is a much more complicated article than the uninitiated would imagine, and my description of its various structures has necessarily been of the briefest.

From the time when the rudimentary egg first enters the egg-passage from the ovary some eighteen to twenty-four hours may elapse before it is completely furnished with all its contents and laid. During that time, supposing it to have been fertilized by a male germ, the embryo actually begins its development. Like all other living things, the single cell of primitive life increases by division into many cells, so that by the time the egg is laid the original germ is a more highly developed organism than it was. At this stage, however, it receives a check. With the cooling of the egg its growth ceases and—again like a seed which lies dormant until such time as moisture and warmth awaken it to life—not until the egg is subjected to the heat of incubation will development continue.

ARRESTED DEVELOPMENT.—Wonderful as this power of maintaining life in a latent condition undoubtedly is, there is a limit to the embryo's ability to remain capable of development beyond a certain stage. The stronger and more vigorous it is, so much the longer is it able to withstand this condition of suspended animation, and all who are acquainted with incubation know, only too well, that the fresher the egg is for hatching purposes the better, and that stale eggs, even though the embryos may develop, rarely hatch satisfactorily. In a later chapter we shall have occasion to refer to this part of the subject again. But before proceeding it would be as well to point out to the reader how very carefully an egg that is destined for incubation should be treated. Rough usage may break the delicate mechanism of the internal portions, if not the shell, and the tiny germ, it must be remembered, is an atom of life that cannot stand extremes of temperature or sudden shocks. Even loud noises have a detrimental effect upon it. Like all very young organisms, the egg—for we may speak of it as a whole—may vary considerably in stamina, so that, while



[*By the courtesy of "The Illustrated Poultry Record"*

WHITE WYANDOTTE COCK AND HEN (AMERICAN TYPE) some embryos can stand a comparatively large share of rough treatment, and yet manage to survive, many undoubtedly succumb through accident if not sheer physical weakness inherited from sickly parents or other causes.

DEVELOPMENT OF AN EMBRYO.—It will not be necessary to follow the story of the embryo's development from the time when incubation actually recommences until the chick is hatched with the minute perception of a biologist. But a knowledge of the main stages through which it passes is essential to the practical poultry keeper, whether he uses sitting hens or incubators. When warmth has been restored to the egg, the latent embryo awakens to life, and in a few hours the germinal disc begins to elongate and send out tiny blood vessels from either side into the yolk. Before the end of the first week these have much increased, and a membrane called the amnion is developing and gradually surrounding the embryo. At this point the eye can be seen with the aid of a microscope, as well us the first wave-like beats of the primitive heart. With the growing of the embryo, and the increasing circulation of the blood, a bag-like protuberance now appears attached to the navel of the little creature, from which are also sprouting the rudimentary legs and wings.

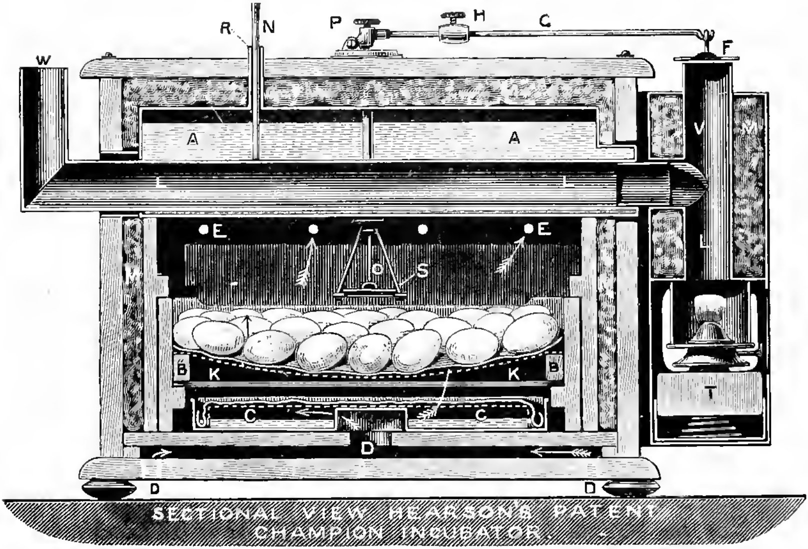
ALLANTOIS.—This bag or sac is called the allantois, and it rapidly grows until it entirely embraces the contents of the egg. This organ is of the utmost importance to the growing chicken, for, attached as it is to the body, and extending to the shell of the egg with its network of blood vessels, it serves as a lung whereby the blood is oxygenated or purified by the outer air. Thus it is to the embryo just what our own lungs are to ourselves, the chicken not being able to use its proper lungs until it has pierced the air cell of the egg, which it does a few hours before hatching. We now not only see why the shell of an egg must be porous, but understand the necessity for ample pure air and cleanliness about eggs that are undergoing incubation. It is about the eighth or tenth day that the allantois becomes so developed, and from that date onwards the albumen of the egg is noticed to be gradually diminishing to supply the wants of the chicken. The yolk, on the other hand, which is in direct communication with the embryo's digestive canal, appears to grow larger rather than smaller on account of the albumen which it is secreting, and which it will continue to pass on to the chicken until the supply of the latter is exhausted. By that time the process of incubation is almost completed. Feathers have appeared, and the embryo fills two-thirds of the egg at least. Gradually the amnion and allantois disappear, the blood flows from the heart through the arteries of the chicken, the membrane that divides the latter from the air cell has been pierced by the beak, the true lungs breathe the air for the first time, the yolk, now considerably reduced in size, is drawn into the body of the chicken, the shell is pierced, and in a few hours a perfect chicken tumbles out of its prison walls and tastes the joys of liberty for the first time.

CHAPTER IV

SOME TYPES OF INCUBATORS

PRIMITIVE INCUBATORS.—Although the hatching of eggs by artificial means is a practice that is old as history, it is only during the last quarter of a century that the poultry keepers of Western Europe and the New World have been able to make it a success. Two thousand, if not more, years ago the ancient Egyptians and Chinese hatched chickens in their huge "egg-ovens," as they do to-day, with unvarying success. And when we consider that these primitive incubators were, and are, practically nothing more than large buildings of sun-baked brick and clay, heated by fires of straw or camel dung; when we know that they have no thermometers, thermostats, moisture trays, water tanks or regulating apparatuses and yet hatch chickens successfully in enormous numbers, we may well be surprised when we remember that the scientific skill of the eighteenth and nineteenth centuries, both in Europe and America, was baffled by the problem as to how to make a reliable incubator. But although the crude "egg-ovens" of the Far East, managed by men whose knowledge of the business is hereditary and instinctive—their ancestors for unnumbered generations having been employed with the same work—now hatch with such remarkable success, history does not record the earliest beginnings of the art. It is more than probable that the pioneers of artificial incubation in the East also struggled for centuries with the problem which, in the course of ages, practice and heredity only have made so perfect. The history of our modern incubator is obviously of a different kind. Early European investigators did not go to the "egg-ovens" of Egypt for guidance, but—although one or two sought the solution of the difficulty by copying some of Nature's methods—they adopted more mechanical and scientific principles. Up to a certain point these earlier incubators were fairly successful, but they all entirely failed to adjust the balance between ventilation and moisture, which meant that the embryos were either drowned or baked in the shell, and the problem of regulating the temperature, so as to do away with the obviously impracticable necessity for constant watchfulness, was an even greater stumbling block.

HEARSON'S INCUBATOR.—Improvement, however, came gradually, but it was not until 1881 that Mr. Hearson, of Regent Street, London, patented his epoch-making machine, the main feature of which was the self-regulating thermostatic capsule in use to-day. Upon the system adopted in this incubator most of the later machines have been modelled, and, notwithstanding the fact that the "Hearson's Champion" is still a favourite, there are many other first-rate incubators on the market which, if they vary from the original in detail, are much like the latter in general construction and reliability. Taking Mr. Hearson's incubator as a type of the best modern machines, of the hydro or hot-water class, the beginner could not do better than carefully study Fig. A, for a knowledge of the principles upon which an incubator is worked is quite essential to successful operating. Near the top of this machine in the section will be seen AA, a tank, nearly filled with water, through which a flue LL, in communication with the lamp T, passes. In the actual machine this flue, instead of coming out at W, returns in horse-shoe shape to the same end at which it started; it is shown right through in the section merely for the sake of clearness. At the top of the lamp flue V there is a valve or damper, F, suspended by a lever G. As the heat enters from the lower end of the chimney L, it follows that the greater part of it would escape at F if the damper were removed, and that if the latter were shut down all, or nearly all, would pass through the tank flue LL. Thus it can be readily understood how, by means of this damper, the temperature of the egg chamber may be regulated. And it is in connection with this part of the incubator that Mr. Hearson's thermostatic capsule, or self-regulating apparatus, becomes so effective. The capsule itself consists of two thin layers of brass, between which a small quantity of "compensated ether" is placed and securely sealed. This compound is affected by temperature,

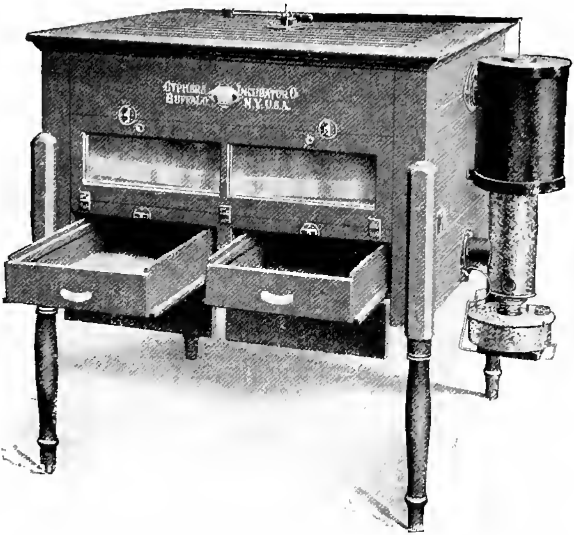


[*By the courtesy of Messrs. Spratt's Patent, Ltd.*

FIG. A.

just as is water or any other liquid, and its boiling point is 98°. The result is that whenever the temperature of the incubator rises to that height the sealed-up ether begins to expand and the brass which encases it bulges. Now referring once more to the section we notice that just above the eggs there is a rigid metal bracket and upon it the capsule S is placed. Resting upon the top of the latter, and held down at P by an adjustable screw, is a stiff iron rod O. When the incubator is set working the operator first of all adjusts this apparatus by means of the screw P and the weight H, so that the damper only just swings clear of the top of the chimney. The reader will now be able to grasp the principle of the arrangement with ease, for the rod O, resting as it does on the capsule, is forced upward by the expansion of the latter whenever the heat increases beyond a certain point, with the result that the lever G is raised, the damper lifted and the excess of heat liberated at F instead of going through the tank. On the other hand, supposing the heat to have decreased by the lamp getting low or other cause, the capsule would immediately flatten and the damper sink upon the top of the chimney, so that all the available heat would be driven into the tank. Hence it will be understood that, provided the thermostat is properly fixed in position at the outset by following the "directions" supplied with the incubator, the temperature in the egg chamber is automatically regulated, and, within certain wide limits, the outside temperature—or the lamp—may vary considerably without that of the incubator altering the fraction of a degree. As will be seen in the illustration the double walls of the incubator are packed with a non-conducting material M. The egg drawer KK is movable and made concave, after the fashion of a nest, so that the eggs at the outside, which would be a trifle cooler than those of the centre, if all were level, are brought higher and nearer the source of heat. At D the air enters the machine, and then, continuing upwards through a piece of coarse net fabric, of the nature of sackcloth, which draws its moisture from a water tray CC and, passing the eggs, escapes at the ventilating holes EE. Hydro incubators are provided with a "drying-box," usually placed at the top of the machine. This is a place in which the chickens are left for the first few hours of their existence or until the whole hatch is completed. Although there are some other types of incubators on the market it will not be necessary for me to deal with more than two, viz. the hydro or hot-water kind just described, and which require added moisture, and those of the atmospheric or non-moisture description.

NON-MOISTURE INCUBATORS.—These latter were first introduced from America, but several machines of this pattern are now manufactured in this country, and, although poultry keepers in England first looked upon them with suspicion, atmospherics have won their way into popularity upon merit alone, and are now, perhaps, as generally used as the hydros. An atmospheric incubator is planned upon an entirely different principle to any of the others, and Mr. Charles Cyphers, who was one of the first, if not the first, to bring out this class of machine, worked out his principles from quite a new basis compared with that adopted by Mr. Hearson and others. He argued that an egg had sufficient moisture in itself for its own purposes, and that it would hatch perfectly well—other things being in order—provided it were not robbed of that moisture by excessive ventilation. But ample fresh air in the egg chamber is, as we have seen, of the utmost importance to the embryo. The earlier makers of the hydro machines knew this, but they either over-did it or provided insufficient, with disastrous results. They tried to allay the drying-up process of a current of air through the egg chamber by causing that air to take up moisture, and they have at last succeeded. But Mr. Cyphers started afresh by going to the root of the matter. He made an incubator that had no tank, no moisture tray, and no ventilating holes, as generally understood. His plan was to induce a sufficiency of warm air to enter the machine and pass through it at the required temperature without having any abnormal drying effect upon the eggs. And this is how he did it.


CYPHERS INCUBATOR CO.
BUFFALO, N.Y. U.S.A.

Mr. Charles Cyphers' American Hot-air Incubator

To all outer appearance, the non-moisture incubator is much like any other. At one end there is a heater, fed by a lamp, the heat from which passes up the middle and down the outside of its three iron cylinders, none of the fumes being able to enter the machine. Between the upward and downward flue the outer air enters the heater and, being warmed in its progress, is carried into the top of the incubator by a cylindrical funnel. It then passes downwards through one or two diaphragms of porous felt, stitched on wooden frames, into the egg chamber. From thence it continues past the egg tray, through another diaphragm, and eventually out at the bottom of the machine. Thus there is a continuous flow of warm fresh air into the egg chamber and out of it for as long as the lamp remains lighted. But that is not all. The great point to observe is the *diffusion* of the air as it percolates slowly and evenly through the felt that obstructs it, so that there can be no actual current and no undue evaporation. Thus we find that eggs placed in these machines, with absolutely no added moisture, will hatch quite as successfully as they do in others—just as they do, in fact, in the nests of wild birds, some of which are always absolutely dry.

The regulating apparatus in these incubators is much the same in principle as that already described, but the expansion capsule is here substituted by a thermostat of quite a different kind. This is constructed by two rigid bars of steel, between which are two bowed strips of aluminium, or zinc, riveted to the steel at their ends. Through the centre a brass rod is passed, and this is secured by a screw-nut both underneath the thermostat and above the base of the lever. The latter is in connection with the damper, which will release or economize the heat of the flues, according to whether it goes up or down. The thermostat is suspended in the egg chamber, and when subjected to heat its bands of aluminium expand. But being riveted to each end of the steel bars, they have nothing to do but to bulge, or bow, with the result that they pull against the lower nut-screw of the connecting-rod. The latter then weighs on the base of the lever arm, which is balanced on a knife edge, and the damper is, in consequence, lifted off the chimney. Thus the metal thermostat achieves the same end as the expansive ether capsule, only it does it in a different way.

The interior of an atmospheric incubator also differs from a hydro in having the drying-box or chick nursery underneath the egg tray. The latter is so placed that when the chickens hatch they crawl towards the front of the chamber, which is fitted with a glass door, and then topple over into the space provided for them below. I shall have occasion to refer to this matter again, and it will suffice to say here that in actual results these two types of incubators come out about equal. There are several good machines of each kind on the market, some of which are illustrated in these pages, and there are many very bad ones. The beginner who hopes to attain success must avoid the latter, no matter how tempting the price may be, for they always prove to be the dearest in the long run. The very best machines are a great deal cheaper than they used to be, and there can be no excuse made for buying an inferior one on the grounds of economy.

CHAPTER V

ARTIFICIAL INCUBATION

It ought not to be necessary, in these days of progressive poultry culture, to dwell upon the advantages of hatching chickens artificially, but to those who may still possess some lingering prejudice in favour of "the old hen" I would say that nothing has done so much to further the cause of the poultry industry as artificial hatching and rearing. Granted that in some cases the broody hen is preferable to the incubator, it is the latter which every go-ahead poultry farmer must depend upon; and the silly doubts which some people possess regarding the physical vigour and prolificacy of fowls that have been hatched artificially are not worth a moment's consideration.

INCUBATOR ROOMS.—In using an incubator a great deal depends upon the room in which it is placed. The latter must be moderate in temperature, well ventilated, and as quiet as possible; any loud noises or sudden vibrations are liable to affect, if not to kill outright, the embryos. A cellar has often been recommended as a place in which to work incubators, but, unless it is properly ventilated and dry, the equable temperature and quietness, which have no doubt made it appear to many minds as a suitable operating room, will not compensate for lack of oxygen. Fresh air, without draught, is of paramount importance when hatching, and this the novice will realize when he remembers that not only do the lamps consume a large part of the oxygen of the air, but the embryos also depend upon it. The incubator room, therefore, should be airy, dry, and as even in temperature as possible. A place that goes below 45° in winter, or that is much affected by sun-heat in spring and summer, does not make a desirable operating room.

When an incubator is purchased the maker always provides exhaustive "directions" for the fitting together of the parts and general management, so that it would be quite superfluous for me to enter into these details here. But there are several points of much importance which should be given rather more than passing mention, for they are beyond the limitations of most "directions," and yet of very great moment. One of these is the maintenance of not only an even temperature but one that is consistent with the circumstances.

TEMPERATURE.—The beginner must not imagine that because an incubator is "self-regulating" it is quite human, for it is not. Within certain limits the thermometer may stand within half-a-degree for weeks—the thermostat responding faithfully to every variation. But during sudden spells of heat or cold a little watchfulness is desirable, and it is not always wise to adhere too rigidly to the rules set down in the directions. For example, we may be told to run our incubator at 103°, or even 102½°, whereas practice will prove that 2° higher will sometimes be more successful. Then, again, supposing the normal temperature of the room—the thermometer hanging in the centre—to be 60°, it is desirable to raise the egg chamber 1° for every 10° of decrease in the outer air, and *vice versâ*. My experience goes to prove that the mean temperature for non-moisture machines should be higher than that of hydros, instead of less as recommended by some manufacturers.

VENTILATION AND MOISTURE.—Next to temperature is the all-important subject of ventilation and moisture. Every beginner must make himself understand that these two are inseparably connected, as already pointed out in the last chapter. He must understand that an egg, having sufficient moisture in itself for its own purposes, must neither be given more than it can do with, nor have its supply evaporated by excessive evaporation. Fresh air is absolutely essential in every type of incubator, but it must either be charged with moisture as it enters, so as to compensate the eggs for any drying effect it would otherwise have upon them, as in hydro machines, or it must be so slowed down by diffusion, as in atmospherics, so that it has no greater evaporating effect than it has when slowly circulating through the plumage of a sitting hen. There are times when both the types of incubators fail in their adjustment of the balance between ventilation and moisture, so that one or the other of the latter must be regulated. In a hydro, for example, the humidity of the egg chamber may be increased by plugging some of the ventilating holes loosely with sheep's wool, so as to slow down the circulation of air. Or a non-moisture incubator may be run a degree or so higher, or have a moisture tray attached, if it is thought that the eggs are too dry. In these latter machines, too, the ventilating slide underneath may often be very efficaciously used, either to maintain humidity or the reverse.

SELECTION OF EGGS.—Too much attention cannot be given to the condition of the eggs which are to be placed in an incubator. They should all be as fresh as possible—not more than a week old—and all those that are mis-shapen, or abnormal in any way, sorted out. Cleanliness is also most important, for, the shell being porous, the embryo in a dirty egg stands a great risk of being suffocated. Not only should the eggs be nearly as possible the same age, but if the chickens are to be reared together those eggs of large and small breeds are best kept separate. The fact, also, that a fertile egg contains a delicate organism, which is peculiarly sensitive to rough usage and extremes of temperature, must ever be borne in mind.

When the eggs have been selected and the incubator kept going steadily for a day or two the former may be placed in position on the tray and put into the machine. At first the temperature will naturally drop considerably, but that need not cause alarm, for it will resume its previous position as soon as the eggs are heated through. And before proceeding further it may be as well to warn the young operator at once never to try and regulate his incubator by turning the lamp flame up or down. Keep the latter fairly high and always the same, but do the regulating, when necessary, by the damper, which is raised or lowered by manipulating the screw at the base of the lever.

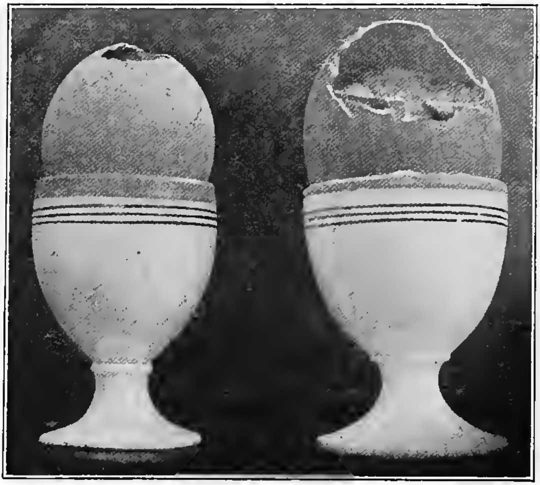
TURNING THE EGGS.—The principal daily task in incubation is the turning and airing of the eggs. The necessity for the former will be readily grasped by recalling the facts stated in Chapter III. There we find that the yolk of an egg floats in the albumen, carrying on its upper surface the germ from which the embryo springs. The yolk, being lighter than the albumen, is borne upwards (so as to bring the germ nearest to the source of heat, which comes from above), and it is only separated from the upper part of the shell—the egg being laid on its side—by a very thin layer of albumen. Now if the egg were to remain for any great length of time in one position the albumen which comes between the yolk and the shell, on the upper side, is evaporated, with the result that both yolk and germ become stuck to the shell, which renders hatching impossible. But if the egg is turned over daily a fresh layer of albumen is, on each occasion, brought between the yolk and shell, and any such accident averted. Generally speaking, it is enough to turn the eggs once daily, and the process is a simple one, very expeditiously done with practice. In the non-moisture incubators the inclined trays, by means of which a whole row of eggs can be turned with one movement, obviate the necessity for so much handling, and the method ensures a constant change of each egg's relative position in the tray, which is always desirable, for, no matter how perfectly an incubator may be made, that side of the chamber nearest the lamp, as well as at the back, must be a trifle warmer than the front, or the side farthest away from the lamp.

AIRING.—Not less important than turning is the regular airing of the eggs. This should be done once daily, the time allowed being varied in accordance with the weather and the development of the embryos. Speaking generally, five minutes the first week, ten the second, and five during the third will be sufficient, more or less being given according to whether the temperature outside is high and dry, or low and humid. The airing is most conveniently done in the evening, if the turning was done in the morning, and while the tray is out upon a table in an airy, but not draughty, part of the room the lamp may be filled and trimmed.

THE LAMP.—This latter is a most important part of the work, for everything depends upon the lamp burning a bright, clear flame without smoky "tails." Always use the best paraffin, and supply a new wick every three weeks. As a source of heat gas is much better than a paraffin lamp, provided there is no danger of the supply being suddenly cut off, and most appliance makers stock convenient fittings.

CHILLED EGGS.—If it should happen that the eggs become chilled, through being left out of the machine too long or the lamp going out, they may often be revived by immersion in water that is comfortably warm to the hand, or about 105°. This will generally bring them round if not too far gone, especially if the embryos are more than ten days old, and they may be left in the water for ten minutes or so—until an incubator is got ready for them. Users of tank machines have an advantage over those who work atmospherics if the source of heat should be accidentally cut off, for a hot tank will retain warmth for many hours while an atmospheric machine very quickly grows cold if the lamp should go out. On the other hand, the champions of the non-moisture incubators may contend that, whereas it takes hours to get the heat up in a hydro (unless the cold water is withdrawn and a fresh, warm supply put in), an atmospheric incubator will respond to the lighting of the lamp in a few minutes.

TESTING THE EGGS.—A very important part of the process of incubation is the testing of the eggs. The object of this is to remove all unfertile or addled eggs, which not only occupy space to no purpose, but the latter emit poisonous gases which have a very detrimental effect upon the living embryos about them. With practice any one may soon become an expert tester. All that is required is a piece of black cardboard with an egg-shaped hole in the centre of it, a candle and a dark room. There are many appliances of different kinds sold for this purpose, and a tester is usually part of the equipment sent out with a new incubator. The process is the same in any case, and it should be conducted at about the ninth day as follows: The operator, not having previously aired the eggs that day, removes the tray after dark and holds each egg in turn between his eyes and the light, and against the egg-shaped hole provided in the tester. If at that period the embryo is "alive and well" the greater part of the egg will be almost opaque, with the air cell at the larger end distinctly visible. An addled egg, viz. one in which the embryo has died at an early period, will appear cloudy and watery, and a dark spot, or blur of red, may be seen as if adhering to the shell on one side. Then there will be the "unfertiles," which are of a pinky white transparency just like a fresh egg. They have never contained the germ of an embryo, and are quite good for cooking purposes if removed at this stage. The beginner may often have doubts as to whether some of the eggs are really addled or merely backward in developing. In such a case he would do well to mark them "doubtful," and, replacing them in the incubator, test them again in a



Air Cell in a Fresh Egg

Air Cell in an Egg at Time of Hatching

(See pages 19, 40–41.)

week's time. If by that stage the air cell is not white and distinct, and the remainder of the egg opaque, there can be no question as to their addled condition. It is only by practice of this kind that one can become an experienced hand at testing eggs. But before passing on I would warn the novice against handling the eggs more than is absolutely necessary. A continuous opening of the egg drawer has a detrimental effect upon the hatch.

HATCHING.—After the eighteenth day the eggs should not be turned, but a moderate airing daily, until the first egg begins to chip, is all that is required. Then the egg chamber must remain closed as much as possible. In atmospheric machines the glass door and inside chick nursery entirely do away with the detrimental effect of opening the drawer before it is possible to ascertain how the hatch is progressing, and one wonders why makers of the hydro machines do not also fix glass fronts, with their infinite advantages, to the egg chambers of their incubators.[1] Of course, one may open the drawer of a hydro incubator in moderation during the process of hatching, but the temptation to "have a peep" is very great, and many beginners mar the chances of their first attempt by too much curiosity. Whatever the temperature may have been during the period of incubation a rise of a degree or more always accompanies the completion of the process on account of the increase of natural heat arising from the bodies of the chickens. This is an advantage rather than otherwise, and in many incubators 105°, or even 106° in cold weather, is not too high at this stage.

If too much handling of the eggs is a bad practice, an attempt to assist nature in the final process is worse.

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[1] Just at the time of writing I hear that Mr. Phipps, of Birmingham, has added both a glass front and inside chick nursery to his well-known machine—features which undoubtedly will be much appreciated.

Within forty-eight hours from the time of the first eggs being chipped all the chickens should be hatched, and those which fail to extricate themselves by that time are generally weaklings which will never be of much use. In some cases they may be helped by cracking the egg in a line from the beak round the shell, but any further attempt at assistance generally does more harm than good unless the operator is a skilled hand. A hatch that is backward and slow in coming out generally indicates a lack of heat, and the reverse is equally true.

FAILURES.—The novice who, for the first time, is practising artificial incubation, must not be disappointed if he has a run of failures, nor must he immediately blame the incubator, for, provided he has a machine by a well-known maker, it is, in nine cases out of ten, his own fault when things go wrong. One of the commonest forms of disaster that the inexperienced suffer is that of the chickens dying in the shell just when they are ready to hatch. It is not possible in this little book to enter into all the causes which may bring this about, but, generally speaking, the embryos have succumbed through sheer weakness inherited from parents that were not as robust as they should be. Moisture and ventilation also play an important part in determining the fate of the embryo, for if there is an excess or deficiency of one or the other favourable results cannot be expected. And it is also more than probable that many more chickens die in the shell owing to an insufficient airing during the process of incubation, rather than from too much. The beginner, anxious lest the eggs should get chilled, does not give them long enough in the open air. It is only by keeping a careful record of the temperature, weather, and other details, and by an intelligent analysis of results, that the novice can become a successful operator.

CHAPTER VI

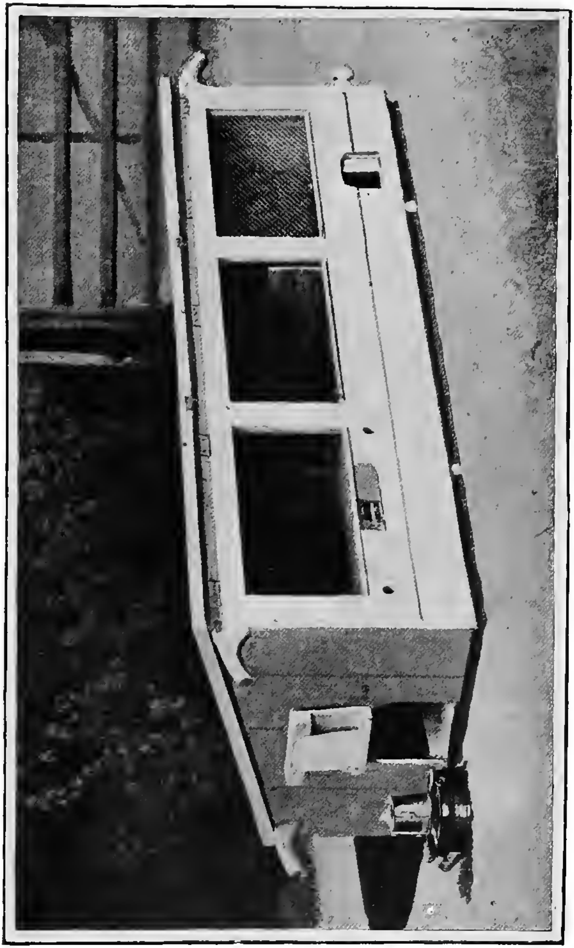
ARTIFICIAL REARING

FOSTER-MOTHERS.—It will not be necessary to dwell for long upon the various types of foster-mothers now on the market. Speaking broadly, they, like incubators, may be divided into two classes, viz. those heated by a lamp and tank of water and those which are purely atmospheric. Both kinds do excellent work, and it would be difficult to draw comparisons between them. But as there are also a number of very inferior machines manufactured, it would be as well to point out, briefly, what the main features of a good foster-mother, or brooder, should be.

As an illustration, we may take Mr. Bertram Payne's hot-air brooder shown on p. 45. This machine is divided into three compartments. Beginning at the left, there is the sleeping, or warmest, chamber, provided with a hover, and which is heated by a lamp placed underneath. None of the fumes of the lamp enter the compartment, but, as in the hot-air incubators already referred to, a constant supply of fresh hot air is constantly flowing into the machine through an aperture covered with perforated zinc, and situated underneath the hover, which is fringed with flannel. The middle, or second, compartment is rather cooler than the first—as it is only warmed by its contact with the latter—and the third, faced with wire-netting instead of glass, and provided with a canvas weather-blind, is only a few degrees warmer than the outer air, and it is open to the grass below. Thus we find that in this foster-mother there are no less than four distinct graduations in temperature, if we reckon the space under the hover as one, and it is always several degrees higher than the other portions of the first chamber. This is a most important point in every brooder, for not only do several compartments so arranged afford the chickens a choice of climate, so to speak—and they are instinctively wise in matters of this kind—but it prevents the possibility of their taking cold, which is inevitable in those brooders which have only two temperatures, and both of these somewhat extremes. Another feature to look for in a good brooder is the lighting. In the illustration referred to the large extent of glass is of inestimable advantage in rearing, and one that might be given more attention by some makers—provided always that there are other chambers or runs, unglazed, to which the chickens may resort when the sun is very warm. Too much glass is as bad as too little, and the makers of some of the best machines illustrated in these pages have recognized that fact by making their glazed surfaces adjustable.

The main difference between atmospheric and hydrothermic foster-mothers is, as the name implies, that the latter are heated by a tank of water, kept warm by a lamp, and placed above the sleeping compartment. In all other general principles the standard patterns of these machines are alike, and it will not be necessary to differentiate between one and the other when dealing with artificial rearing.

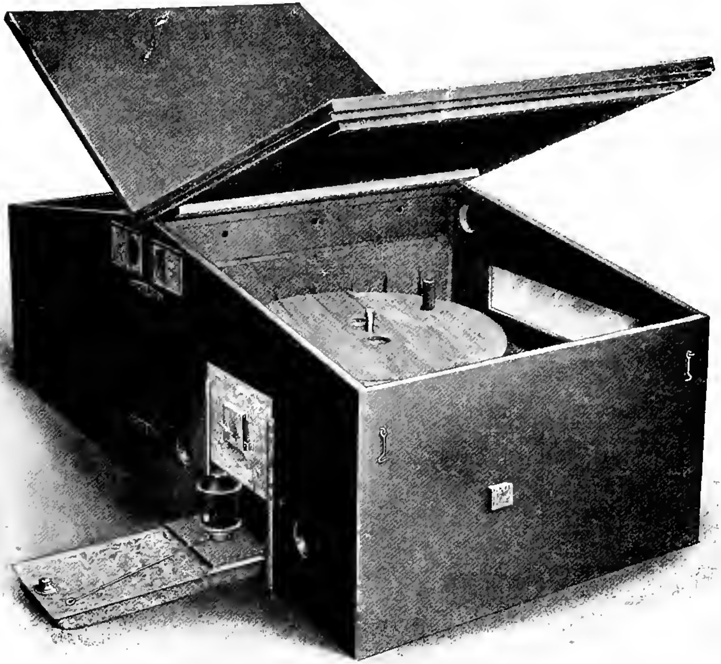
PREPARING THE FOSTER-MOTHER.—When the chickens have begun to hatch, the foster-mother should be made ready, so that it may be working steadily by the time the chickens are ready for it. Here again the novice will generally be able to go by the directions



Mr. Bertram Payne's Atmospheric Foster-mother supplied with the machine, but I would emphasize the necessity for taking the utmost care in trimming the lamp, so that it burns with a clear flame which is neither too high nor too low. Litter must be provided in all parts of the brooder, and this, for preference, may be dry soil covered with a layer of chaff, the whole being about two inches thick. When the lamp is first lighted, a good deal of dampness will arise from the litter and interior generally, and this should be liberated by leaving the lids of the machine open about half-an-inch for a few hours. The best temperature to maintain in the warmest part of the sleeping chamber for the first few days is about 90°, when all the chickens are together. But before the latter are removed to the brooder from the incubator, a temperature of about 70°–75° will be ample for a fair hatch, for it will then soon increase to 90°, or thereabouts, by the addition of the natural heat of the chickens themselves.

TEMPERATURE.—But I would here urge the rearer not to pin all his faith upon thermometers. As a guide they are useful, but the only way in which a beginner can become a successful rearer is to use his observation and common-sense regarding this and other matters. He must not allow himself to get into a kind of automaton, doing things by book in a mechanical sort of way. For example, he should accustom himself to judge by the appearance of the chickens as to whether the temperature is the right one. If they are too cold, they will be crowded into the warmest place—the stronger ones very possibly crushing or smothering the weaker. On the other hand, they will, in an excessive heat, move towards the cooler parts of the chamber, or squat down listlessly, often panting heavily. When the temperature is all right and things are congenial the brood will indicate their comfort by sleeping contentedly, or moving about in that happy manner peculiar to healthy young chickens.

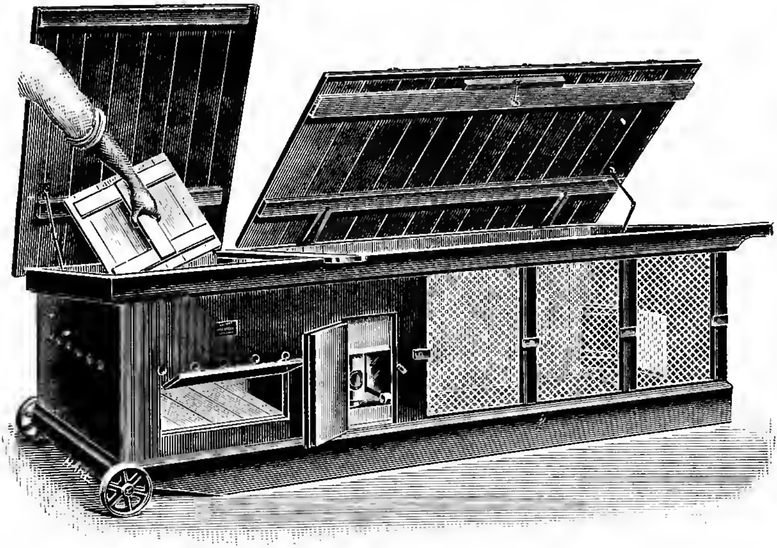
A perpetual, discontented chirping is a certain indication that something is wrong. Under the varying influences of our changeable climate, it is absolutely essential that the rearer should rely upon his observation rather than the thermometer. Large broods of chickens require less artificial heat than small ones. As the birds grow the temperature must be gradually reduced, and in cold weather it is sometimes desirable to allow more lamp-heat by day—when only a few of the chickens are in the sleeping compartment at a time—than is necessary at night, when all are together. These are a few of the



Messrs. Cyphers' Style A Atmospheric Foster-mother points which the beginner must consider, and, as a final warning, I would add that more chickens die from excessive heat than from the reverse. They are "killed by kindness"—thousands of them every year.

SIZE OF FLOCKS.—I have already spoken of the desirability of keeping chickens of the same age and breed together, and it may be remarked here that it is a very grave mistake to run too many in the same flock. We hear of 100-chick foster-mothers, but no practical hand would ever dream of rearing so many birds in one lot. If the foster-mother were as big as a parish church the baneful effect of attempting to run so many chicks together would be almost equally evident. It is not so much a question of the size of the accommodation but of numbers of individuals, and the beginner may understand, once for all, that forty or fifty chickens are ample for one flock in a 100-chick brooder, and that appliances made to take fifty should not be stocked with more than thirty at the most.

FEEDING.—We now come to the all-important subject of feeding and, referring to a former chapter, find that just before hatching the chick absorbs the yolk of the egg into its abdomen. Thus Nature endows the little creature with sufficient nourishment to maintain life while the body gains strength enough to enable the bird to pick up and assimilate other food. For about the first thirty-six hours of its existence, therefore, the chicken requires no hand feeding and, unless hatching has been very prolonged, the brood can be placed in the foster-mother before being given their first meal. The latter should consist of hard-boiled egg—unfertiles will do—finely chopped and mixed with stale bread crumbs and coarse oatmeal. Or, as some feeders prefer, a raw egg may be mixed with oatmeal and crumbled bread until the whole is friable and quite free from stickiness. Sprinkle the food, in the first instance, on a flat piece of wood, or slate, by the window in the warmest chamber, giving a little at a time every two or three hours. Next day coax the chickens out into the cooler air of the second compartment—or third if they are strong enough—and do not give any more food in the sleeping place. They will be shy of coming out to begin with, but they must be taught what is good for them, and on no account may coddling be indulged in. On the second or third day egg food must be gradually discontinued, the oatmeal and stale bread being moistened with a little milk.



Mr, Tamlin's "Nonpareil" Foster-mother

DRY FEED.—Now, too, some dry feed, which is a mixture of seeds, may be introduced, and this is best sprinkled in the litter in small quantities. This kind of food has become immensely popular of late years and for many reasons. It is fairly cheap, it is ready for use, does not get sour, and it is the only kind of food that we can sprinkle in the litter and so afford the chickens diversion and exercise in looking for it. There are some rearers who feed upon it alone, but I have not found that the best results are obtained from such an extreme method. Dry feed may well be made the staple diet, but a quicker growth is assured by giving a proportion of soft mixtures also. The former, apart from the useful properties already mentioned, gives the chickens' gizzards and digestive organs some work to do—which means that health is promoted—while the latter is more quickly assimilated by the system and therefore acts in a more stimulating manner upon growth and development.

Chickens appreciate a change of diet just as we do ourselves, and this may be best brought about by varying the soft food. Supposing that bread and oatmeal, moistened with milk, have followed the egg, and the youngsters have become accustomed to dry feed, some biscuit-meal scalded, and then made crumbly with middlings, or thirds, will make a useful diet. Boiled rice (after rinsing with cold water and straining) may also have middlings stirred into it until quite friable, when it will be a wholesome food and one that is much liked by chickens. Green stuff, minced or chopped fine, is also very essential in rearing, more especially in the very early months of the year, or whenever the chickens cannot get it for themselves. And one of the very best vegetables to use is the onion. It is cheap, always obtainable, the chickens are very fond of it, and apart from its health-promoting qualities it is a great preventative of gapes and diarrhœa. Among other vegetables worthy of special attention in this connection I would mention lettuce, dandelion, tender cabbage, nettle tops (scalded) and tender grass—all cut up fine. Except in summer, when chickens can usually obtain sufficient if at liberty, some animal food in the form of prepared meat, or butcher's offal, such as " lights " boiled and put through a mincer, is essential if the best results are to be attained. But meat must be used sparingly, especially if milk or other nourishing food is also being given. It may be mentioned here also that chickens can stand, and need more animal food, or that of a heating nature, in cold weather than when the temperature is high, and the feeder must ever bear in mind the relationship between the conditions of life and the food he selects. Space will not permit me to enter further into this matter of the choice of food, but the intelligent rearer cannot go very far wrong if he practises his 'prentice hand with the mixtures I have mentioned, supplemented by house-scraps (minced) and milk. The latter, when fresh, is one of the best foods that could be desired and may be used in an endless variety of ways.

NUMBER OF MEALS.—Perhaps greater mistakes are made in the manner of feeding than in the food itself, and the commonest error is that of giving too much at a meal. It is quite impossible to say precisely what quantity chickens should be allowed and how often the food should be given, for conditions vary so widely. The safest guide to go by is the appetite of the brood. The chickens may be given as much as they will eat, but not oftener than every two hours the first week, reducing the number of meals gradually to four a day, and then to three by the time the birds are about ten weeks old. When soft food is fed the chickens should eat it greedily and clear all up. If any is left less must be given next time, for food that is discarded and trodden under foot soon gets sour—which brings on diarrhœa if eaten—it attracts vermin and destroys the appetites. On the other hand, the feeder must make sure the birds get enough at each meal to satisfy them, but no more. Of course, I refer to soft mixtures, for with dry feed it is a different matter, as already indicated. No matter what season it may be, the first feed in the morning must be given as soon as it is light enough for the birds to see, and the final meal at dusk. The former should be a mixture and the latter a dry feed, this being, on this occasion only, placed in a shallow trough, for if it were sprinkled in the litter darkness may set in before the birds have found enough for a supper, which should be a substantial meal, more especially when nights are long. When circumstances permit it is always wise to feed soft food on the turf, provided the latter is clean, and when the chickens are fairly strong they are best fed at some little distance from the brooder, selecting a fresh plot of ground for the purpose daily.

After the first two or three weeks cheaper mixtures, such as ground oats and middlings, stirred into a crumbly state with milk or meat liquor, may be given instead of biscuit or any of the many patent foods now sold for chicken rearing. Maize-meal, scalded and mixed with middlings when cold, makes a useful change, and stale bread, if it can be obtained cheap, may still be used moistened with milk, broth, or hot water. When the last named is given a little granulated suet or dripping should be added and middlings finally stirred into it to prevent stickiness, which must never be tolerated in food for poultry of any age or kind.

GENERAL HINTS.—A gradual reduction in the temperature of the brooder must accompany the chickens' growth until they are about six or seven weeks old, according to the season and weather, when lamp heat may be dispensed with altogether. Great cleanliness must be observed all along, and when the lamp is being trimmed—which must be done carefully and regularly every day—the foster-mother may be opened for an airing, provided the weather is fairly fine, and the chambers cleaned or litter renewed as may be necessary. Throughout the period of rearing the chickens must be kept out in the open as much as possible, and it should scarcely be necessary to state that the rearing ground must be as dry as possible, well sheltered, and for preference covered with short turf. Long grass should never be permitted in the chicken nursery.

[*By the courtesy of " The Illustrated Poultry Record"*

REARING UNDER DIFFICULTIES

During the first week or so it is a good plan to use a small wired-in enclosure attached to the brooder, which shelters the birds from cold winds and prevents them from wandering too far away from the entrance of the foster-mother until such time as they know their way in and out. The run may then be extended to what practically amounts to an unlimited range where it can be afforded, but it is often wise to erect some small-mesh wire around the rearing ground to prevent the birds from straying too far, and this fence will also, to some extent, check such vermin as rats and stoats.

When the brood has become accustomed to doing without lamp heat they may be removed to more roomy quarters. For these half-fledged youngsters there are various kinds of houses, or "cold brooders," as they are sometimes called, on the market, and provided they are weather-proof, have dry floors, and about two-thirds of the front open—with adjustable shutters for bad weather—they will serve the purpose. These chickens should be placed in a new run when transferred from the brooder, and it will generally be noticed that the effect of the change will be a most favourable one upon their growth and health.

WATER FOR CHICKENS.—But before closing this chapter there are one or two most important items to be dealt with, and the first of these is the water supply. Not long ago many rearers brought up their chickens without water, as they considered that it brought on diarrhœa and, indirectly, gapes and other diseases. But with the wider use of dry feed a water supply has become absolutely necessary. Personally, I never considered chickens would do as well without water and always provided it. And in every instance of disease, or trouble of any kind, that has come under my notice, and which has been attributed to the water, I have found that the latter had become an evil because it was either dirty or supplied irregularly. Given a supply of clean water, kept in a proper vessel in a shady spot, and no ill results will arise. But once let carelessness intervene and that which is one of Nature's greatest health promoters will become a fruitful source of disease. There are many useful drinking fountains now manufactured, the best being those which are easily scoured out inside. Some of the older patterns, into which it was impossible to see, much less to reach, should not be tolerated for a moment. The chickens' water vessel should never be placed inside the brooder, except when bad weather prevents the birds from getting out.

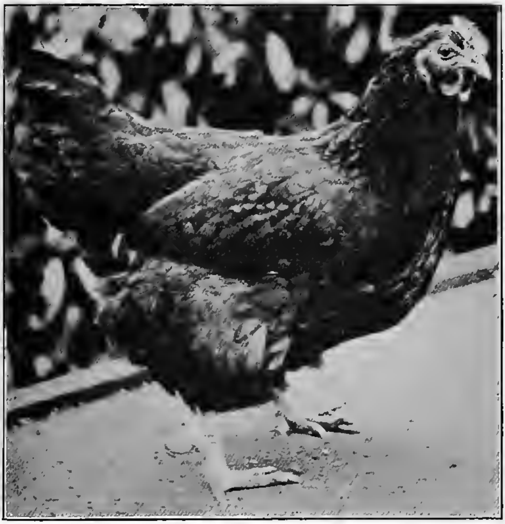
GRIT.—Next to water in importance is a regular supply of sharp grit of a suitable size for chickens. This assists the latter to grind and assimilate the food which, having been softened by the crop, is passed on to the gizzard, where the final stages of digestion are completed. It is impossible for birds to do without grit and remain in health, and even when they are at liberty the natural supply of small sharp stones soon gets exhausted. Every appliance maker sells grit of a suitable size for chickens, and no rearer should attempt to do without it. This must never be mixed with the food, but placed in a shallow box in the run, which may be replenished at intervals.

CHAPTER VII

HATCHING AND REARING WITH THE HEN

As there are many small poultry keepers who, for various reasons, depend upon the broody hen for hatching and mothering the chickens, some hints here upon the main points of importance should be useful. The best hens for this purpose are those of the cobby, Wyandotte type, which have short, fine legs and feet, free from feathers, abundant plumage and a docile disposition. Many mongrels, or "barndoors," make excellent sitters, but hens vary so much in disposition that it is not possible to say that one specified variety is any better than another.

THE NEST.—The sitting nest is nearly as important as the sitter, for if it is not properly made the most reliable hen may spoil her clutch. It may be constructed in this way. Take a square box not less than eighteen inches each way and stand it on one side so that the door is at the front. Make several one-inch holes round the sides close to the top for ventilation, and nail a piece of wood, about six inches deep, across the bottom, at the entrance, to keep the nesting material from falling out. Now cover the floor of the box with garden soil, and work the latter up into the corners with the hand until a saucer-shaped hollow is formed. In that sprinkle some soft, short hay, and spread it evenly over the soil until a firm, well-lined nest is made. The concavity should then be ready to receive the eggs, which, for an average hen, under normal conditions, may number thirteen. In the depth of winter it is desirable to give rather fewer, and in warm weather a good hen may succeed satisfactorily with fifteen. Very much depends upon the nest, for if it is too flat the eggs will spread out, making it impossible for any hen to cover them, while if it is too concave the outer eggs may roll on to those in the centre and there get crushed by the hen.



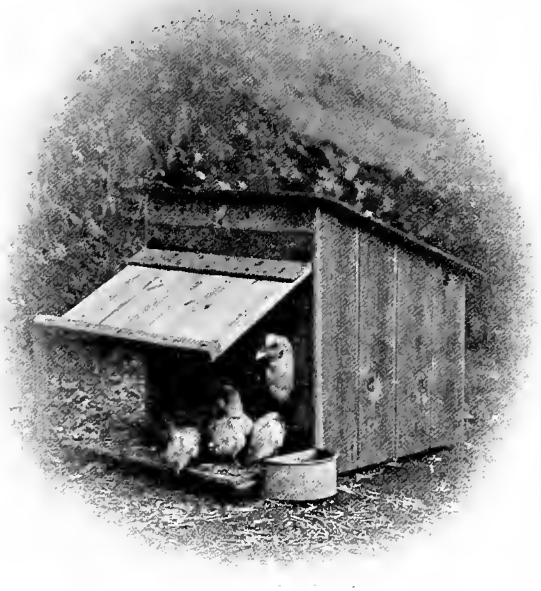
A USEFUL TYPE

The Rev. Lewis Jones' Black Wyandotte Hen

The best place to put the nest-box is at a convenient height from the ground in a quiet shed, away from the sound of other stock or any disturbing noises. If there is any doubt as to the hen taking readily to the nest she should be placed on a few dummy eggs for the first day and night, after which—if she appears to be settled down—the proper sitting may be given to her, this being done in the evening for preference.

THE SITTING HEN.—Every day at a regular hour the hen must be carefully lifted off the nest and provided with as much corn (cracked maize or barley) as she cares to eat, and water. Some grit is essential, also a heap of dry soil in which she can dust herself and so rid her body of any insect vermin which her plumage may contain. But I would emphasize, in passing, the necessity of thoroughly dusting the broody hen with insect powder before she is placed on the nest. The powder must be sprinkled well underneath the feathers, especially about the root of the tail. And at least once a week during the period of incubation the dredger should be again applied, sprinkling the nest at the same time. There are more eggs smashed and more failures in natural incubation brought about by the irritation of insect vermin than from all other causes put together, and a hen that has parasites about her will pass them on to her brood with inevitable disastrous results. No soft food or green stuff should be given to a broody hen, the one daily feed of grain being quite sufficient. While she is feeding and exercising the nest may be inspected, and if any eggs have been fouled in any way they must be washed in tepid water. The broody may be left off the nest for five to eight minutes daily for the first ten days, after which nearly twice as long may be permitted, provided the weather is normal. But before replacing her she should be given time to obey the requirements of nature or a fouled nest will be the result by next morning. A broody hen must always be handled very gently and tamed by every possible means, and when returning her to the nest she should be placed on the edge only and be allowed to go on to the eggs in her own way.

Testing the eggs is not such an important matter when batching naturally as it is when using incubators, but it is desirable to remove the clear and addled eggs at about the tenth or twelfth day, and if two hens are set at the same time it may so happen that, after testing, all the live eggs remaining may only be sufficient for one hen, to which they may be transferred, the other being re-set with a new clutch. Or, in larger undertakings, three broodies may be set upon the same day and the living eggs divided between two.



[*By the courtesy of " The Illustrated Poultry Record"*

A Happy Family

Economy thus practised often means a great deal in the early months of the year when sitting hens are very scarce. The less a broody is meddled with at hatching time the better. She should not be removed from the nest after the first egg is chipped, and this can be ascertained by gently raising her breast upon the nineteenth or twentieth day. A small pan of grain, soaked in water, may be placed within reach of her beak, and upon the following day the empty shells may be removed and a casual inspection made of the progress of the hatch.

THE COOP.—Before the hen and her brood are ready to be removed from the nest a coop should be got in readiness, and a glance at the illustration will show the novice what this latter should be like. Its most important features are its size—which may be anything from eighteen inches each way—and its weather-proof qualities. Both the roof and floor must be well put together, the former having plenty of fall for the water, and wide eaves. Coops without bottoms, though useful for some purposes, are not recommended for general use. The night shutter in many coops made by appliance makers does not allow of nearly enough ventilation, and the rearer would do well to see that at least one-third of the front, when closed for the night, is made of open fine-mesh netting. If the whole night shutter were made of the latter for summer use, we should have fewer complaints of disease and mortality.

The rearer will naturally select a sheltered, sunny spot for the chickens, and the remarks made in the last chapter regarding runs apply equally here. The same litter recommended for brooders may be used in the coops, and detachable wire enclosures will always be found useful for the first few days. It is best to keep the hen enclosed in a coop during the rearing period, feeding her on grain, while the chickens are given that food recommended already for those being artificially reared. Occasionally it may be wise to allow the mother and brood to wander at will, within certain limits, but when rearing is made a serious business, and is no longer the happy-go-lucky process which so many farmers and cottagers permit it to be, then the hens and their respective broods should be placed at convenient distances apart in a place reserved as a chicken nursery.

When rearing with the hen the number of meals and other details may be arranged as advised in the last chapter, and space will not permit me to add any more here beyond emphasizing the necessity for cleanliness in the coops and about them. The latter should be moved on to fresh ground—if only a few yards—at least once a week, and whenever the grass gets at all long it must be mown. For a single coop a garden path is an excellent place and, provided the hen is kept shut up, the chickens will do no harm to most gardens. Indeed, they will devour an enormous number of wood-lice, earwigs, and other noxious creatures which do enormous damage to vegetables, flowers and fruit, and I know of more than one gardener who not only runs small broods about his cultivated land, but large batches of chickens in foster-mothers. And no one who has not put it to the test can realize how effectually chickens can rid a piece of ground of insect pests and what a wonderful effect the latter, as a food, have upon the birds' growth and health.

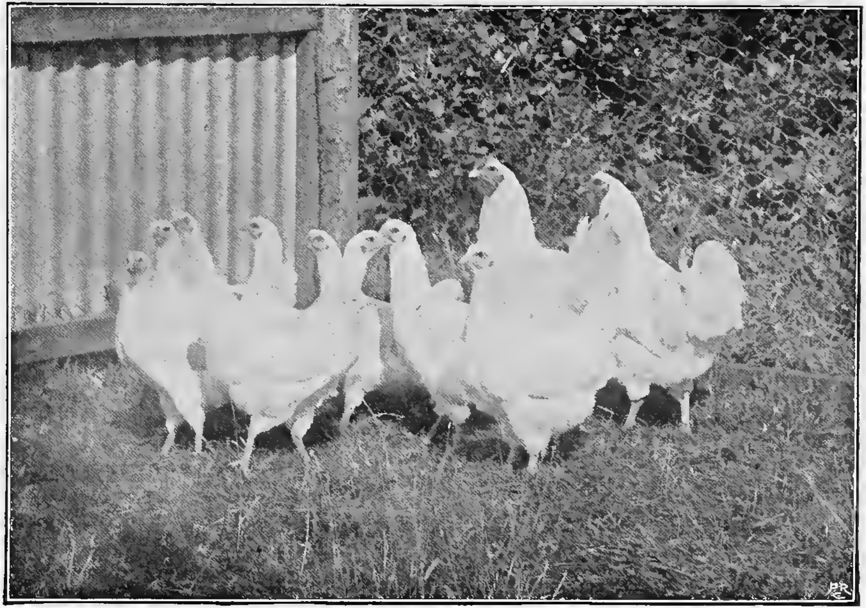
At the age of five or six weeks, due allowance being given for the state of the weather, the hen may be taken from her brood, and, after the latter have had a few days alone in the coop, they must be placed in more spacious accommodation. Several broods may, at this age, be amalgamated in an ordinary chicken-house for half-fledged birds, and, as in the case of those artificially reared, a change of run should be provided at the same time, if possible.

CHAPTER VIII

HALF-FLEDGED CHICKENS

Management and Destination

SORTING OUT.—When the chickens have been removed from the brooder or coop, as the case may be, to more extensive quarters, their future management must depend on what their destination is to be, for it would be obviously unwise, for example, to treat birds which are going to be reserved for stock in the same way as those which will soon be marketed for consumption. In the former we want to maintain a steady growth, so as to ensure a sound constitution, while the stock for fattening may be pushed on with all speed, so that they may be marketed on the earliest possible date. Supposing, for the sake of illustration, that the rearer has a flock of chickens six weeks old, and that they consist of crossbreeds for table, pullets bred from stock selected for their laying propensities, and a surplus of cockerels from among the latter. All these should be sorted out as soon as the sexes can be distinguished, the largest and best range being given to the pullets. Any cockerels that it is desired to keep must be removed from the remainder and penned by themselves in a good run, away from the pullets and, if possible, out of sight of the stock, and the marketable birds put up to fatten. As the chickens grow the flocks must be reduced, for, no matter how large the house and run may be, great numbers do not do well if all running together. Much better results are obtained



SOME PROMISING WYANDOTTE CHICKENS
The property of Mr. Bertram Payne, St. Albans

from dividing a pen of fifty into two of twenty-five, or even into three lots—a separate house, or part of a house, being given to each. This is particularly important in the case of the stock chickens, which must have ample space indoors and out. In feeding these birds stimulating foods, such as meat, must be used sparingly, for any forcing has a detrimental effect, and a too early maturity is not desirable. Good sound grain, such as wheat or best oats, which has gradually superseded the former dry feed, with dari and a little flat maize (cracked) for a change, makes a good staple diet, while for a soft food house-scraps and middlings, ground oats and middlings, maize meal and best broad bran (both scalded and allowed to cool) and vegetables, boiled and mashed with any of the above may all be used in their turn. For mixing the above, separated milk, buttermilk or meat liquor can be used, though in spring and summer, when the birds, on a good range, can obtain a quantity of insect life, water will be sufficient.

FEEDING STOCK CHICKENS.—A sprinkling of dry bone-meal over the soft food is very helpful in building up the constitutions and in preventing leg-weakness and crooked breasts. Over-stimulation and over-fatness must be guarded against, exercise encouraged by every possible means, and if the grain is scattered about the grass, or among leaves, or other litter, in various parts of the run, it will do much to promote heathful diversion among the flock. For these half-fledged chickens four good meals a day will be sufficient, under average conditions, the breakfast being a soft mixture and the last meal at night dry grain. If the appetites are not very keen three feeds only should be allowed, and this number will be ample for any growing stock that have attained the age of nine or ten weeks. Much depends upon the run and the season, for there is obviously a very great difference between a sixteen-hour day in June and one of only about half that duration later on in the year, when autumn chickens are being reared.

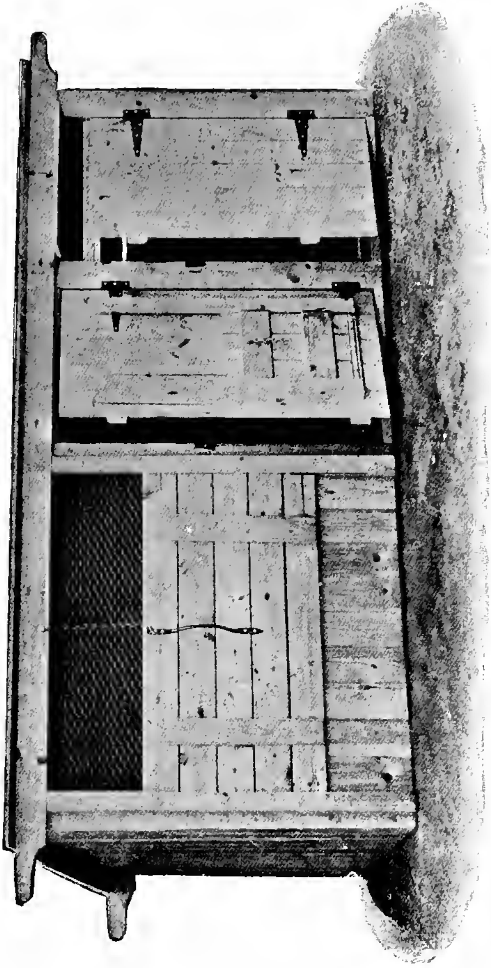
FATTENING TABLE CHICKENS.—In dealing with the table chickens one must be largely guided by circumstances. The specialist who makes a business of producing fat poultry of the best quality usually goes in for feeding the birds in cages (see Chap. XIII), the food being given either in a trough attached to the front of the cage, or administered by means of a cramming machine. In both cases much practice is necessary before one can achieve success, for such methods of fattening require peculiar skill, and it may probably be due to that fact that cage-fattening is so comparatively seldom practised. Nevertheless, it is by these means that the finest table poultry in the world are produced, and the beginner bent on making a speciality of this branch of the work should not begin—at least not in a large way—until he has served a term of tuition on a fattening establishment, such as one of those in the districts south-east of London, where the business is seen at its best. The staple diet used by all experienced poultry-fatteners is Sussex ground oats, mixed into rather a sloppy consistency with sour milk, and on this food alone, with the addition of a little fat or suet towards the later stages, the "lean chickens," which are purchased from all over the country at the age of about ten or eleven weeks, are converted into the far-famed "Surrey" or "Sussex" fowls.

Most of the readers of this little book, however, will find that ordinary hand-feeding will suit their convenience better than cage-fattening, but I would emphasize the necessity for more attention being given to this matter by all, even the humblest cottager, who sell chickens for table. There should be no excuse for offering the public the scraggy, badly fed fowls which the anxious carver so often has to put up with, and no matter how daintily a bird may be trussed, its shortcomings are often only too apparent on the table.

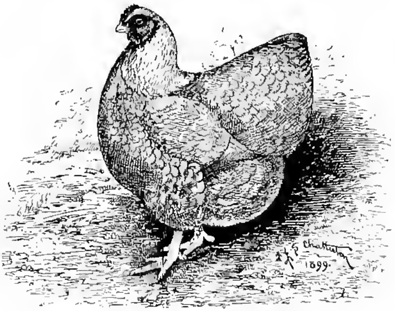
The average poultry keeper who desires to improve his chickens for market purposes must first of all see that the sexes are separated and that the birds—more especially the cockerels—are taken in hand soon enough. Whenever the latter can be distinguished from the pullets, which is usually when about nine or ten weeks old, they must not only be separated from the latter, as already recommended, but have their liberty restricted. Too much running about means waste of tissue and a hardening of the muscle, so that fairly close quarters are desirable. If these birds can be so fenced in that they cannot see beyond the confines of their run so much the better, for they may otherwise fret for liberty. The best food to use in this system of fattening is also ground oats and milk, but the latter need not be sour. Barley meal and middlings, or maize meal and middlings may be fed for a change, and such supplementary foods as boiled potatoes, stale bread, linseed meal, bean or pea meal, with an occasional feed of steamed wheat, barley or crushed maize. It is not desirable to give dry grain, and green food is not essential so long as the birds remain healthy. Buttermilk, both in the food and as a drink, will take the place of green vegetable as a health preserver, while, at the same time, it will assist in the fattening and promote whiteness of flesh.

Next to giving the right foods prepared in the right way is the importance of maintaining a keen appetite, for if the latter becomes sickened it is hopeless to endeavour to succeed.

Give the birds rather short rations to begin with, and never allow more food than what will be cleaned up at a meal. A heaped-up trough left to get stale attracts vermin; it is wasteful and unwholesome, and certain to



MR. TAMLIN'S "JACK-OF-ALL-WORK" POULTRY-HOUSE. USEFUL FOR HALF-GROWN CHICKENS OR ADULTS lead to the birds refusing food altogether or eating but little. Twice a day is often enough to feed chickens which are penned up to fatten, and between meals they are best kept in semi-darkness, a wide shelf, placed about two feet from the floor in the roosting-place and well covered with straw, being provided for them to rest upon. They should be treated as quietly as possible, and if any bullying goes on the aggressors must be isolated. Whenever the appetite slackens it is wise to miss a meal or two, giving a little more liberty for a day or so in a small enclosure adjoining the shed. The feeding may afterwards be gradually increased and the appetites coaxed with a change of food while, at the same time, the liberty is being again restricted until the previous conditions are restored. Two or three weeks before the birds are to be marketed, some suet, or other clean fat, may be mixed with the food daily, taking care not to over-do this at first, and some cheap rice boiled in milk is very helpful and much liked by the stock.



[*By the courtesy of Mr. C. H. Bradley*

BUFF ORPINGTON HEN

AGE FOR MARKETING.—Chickens put up to fatten at the age of eight or nine weeks should be ready for market in three weeks, if of the right kind and the process has been well carried out. With some breeds, under special conditions, it is quite possible for birds to be ready for table at a much earlier age, but they are those which have been bred for this particular purpose and fed from the shell onwards with forcing foods, such as a diet of bread and milk, or oatmeal and milk only. The cottager, or farmer, who does not make a speciality of table chickens, but merely sells his surplus cockerels, usually errs on the side of keeping the latter until they are too old. As soon as a bird begins to crow it goes back in condition. It loses the plumpness which it had a week before, and though it may increase in weight this is made up not by breast meat but by bone and muscle. Some breeds, of course, are longer in coming to that stage than others, and that is why they are especially adapted for fattening. The cockerels of the light and active non-sitting breeds will often begin crowing when they are not as big as partridges, whereas a Brahma-Dorking cross will be a large and heavy fowl before it begins to proclaim its sex. But the average poultry keeper can strike a medium between the two. He generally desires a breed or cross-breed that will combine both laying and table properties, in which case he could not do better than cross some of the heavier sub-Asiatic breeds and the larger Mediterraneans—Orpingtons, Wyandottes, Rocks, Minorcas, Leghorns, or the best of his "barndoors"—with a Houdan cock. But we will return to this subject of breeds and crossing anon.

CHAPTER IX

THE FARMER'S FOWLS

There is no class of rural worker who is better able to make money by poultry than the farmer, yet he is the most backward of all—the slowest to take advantage of those peculiar conditions which make this industry, were it taken up in the right way, one of the most profitable branches of farm work. The present position of poultry upon farms is somewhat like this. There is a mixed flock of birds, generally of various ages and conditions, running about the yards, pig-styes, and middens, roosting anywhere—on the trees, or in a dingy hovel, which is ill-ventilated, badly lighted and unclean—and fed in a casual, thoughtless fashion on wholly unsuitable foods. Such diseases as enteritis and tuberculosis are often present and no attempt is made to stamp them out. These hens, it is needless to say, do not lay a profitable amount of eggs, and the farmer complains that they do not pay. Of course they do not, and if the other live stock on the farm were treated in the same happy-go-lucky, slipshod manner there would soon be complaints made against them also. But if the fowls had the same amount of attention bestowed upon them, in proportion to their wants, as the agriculturist gives to other sections of his holding; if some care were given to mating, selection, the stamping out of disease, hygiene, feeding and housing, I venture to assert that the abused feathered stock would prove far more profitable in proportion to outlay and upkeep than any other branch of farm

VIEW ON MR. TOOVEY'S POULTRY FARM AT KING'S LANGLEY

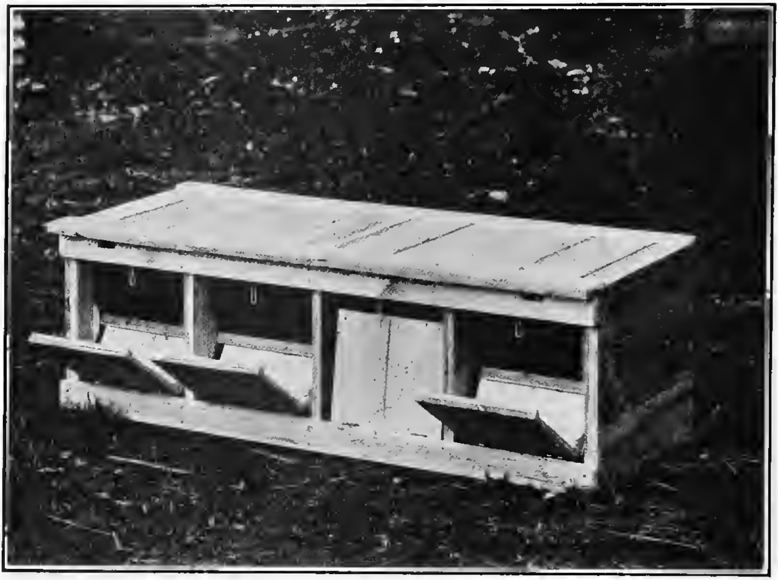
Where a large number of birds are run to the acre on arable land for one year, the land then being cropped with splendid results work. Younger generations of farmers are finding this out, and it is pleasant to record a marked improvement in their poultry generally, but there is much yet to be done, and that old antipathy which Hodge has ever shown towards things feathered must die out before the country will produce anything like the number of eggs which it is capable of yielding.

BREED AND STRAIN.—The first thing a go-ahead farmer should do if he wishes to get the best possible return from his poultry is to go in for some field-houses, and, having weeded out all the ancient and diseased birds from his farmyard flock, stock them with the best and most promising pullets. If he decides to start with an entirely new lot so much the better, and he must choose his breed according to his requirements. For field-houses, when eggs only are required, Anconas, Leghorns, Wyandottes or Orpingtons will suit most localities, but if purely utility, all-round birds are required, the progeny of any of the above, with a Houdan cock as sire, will be hard to equal. But it may be well to state here, that breed is not of such great importance as *strain*, and that the two terms are by no means synonymous. The latter means a family of a breed having some distinctive features of its own. For example's sake we may take one breed—the Buff Orpington. Here we have a fowl that is bred by various breeders wishing to achieve different ends. One may ignore prolificacy and go for colour or other show-points only, while another may select his birds for prolificacy and take no notice of the requirements of the show-pen. The result is that in the former case laying properties are allowed to lapse while in the other they are promoted. To the utilitarian, therefore, it is obvious that all Buff Orpingtons have not the same value. A five-guinea bird may (I do not say always) prove to be far less useful than one at five shillings, for the simple reason that the more expensive bird is a fancy article while the other has been bred for laying and for that purpose only.

No one will grasp these facts quicker than the farmer himself, who for centuries has recognized the importance of strain over breed when dealing with other utility stock. Therefore, in selecting his birds for utility purposes, the would-be poultry keeper must not be led away with the belief that one breed is better than another as a layer, but that it is *strain* which he must look to. There are White Wyandottes and White Wyandottes, just as there are Shorthorns and Shorthorns on every dairy-farm. There are, undoubtedly, certain wide differences in the prolificacy of breeds such as, for example, exist between poor layers like Game and Dorkings and good egg-producers such as Anconas or Minorcas. But that is not enough for the breeder bent on egg-production. He must select first of all a good breed, and then go in for *the best strain of that breed.* This is a point of such paramount necessity to the poultry keeper that he must never lose sight of it.

A TYPICAL WHITE ORPINGTON COCK, WINNER OF MANY PRIZES
The property of Messrs. Whitaker and Tootill

IMPORTANCE OF SELECTION.—Selection is the keynote of success in all breeding, and it is by continuously selecting the best and most prolific layers, and by weeding out the drones, that laying strains are built up. And it is within the power of every poultry keeper to improve the prolificacy of his flock, year by year, by persistent selection. Breeders who have made a speciality of producing laying strains have adopted the trap-nest as a means of ascertaining which individual hens are the most prolific. This is an appliance in the form of a nest which has a door that automatically closes as soon as a hen has gone in to lay. The attendant in charge of the flock visits the nest at intervals and liberates the hen



Mr. Bertram Payne's Trap Nest

after having credited her (she is distinguished by a number attached to a leg-band) with the egg laid, a chart being kept for the purpose.

This obviously takes time, and most farmers would never adopt trap-nests on that account. Then, again, many nervous hens do not like these appliances and lay elsewhere rather than use them. To the specialist breeder of laying strains, however, the trap-nest is a valuable asset and really the only infallible means of recording individual egg averages. But I do not think the rank and file of industrial poultry keepers will ever adopt it to any extent. Selection may be practised and strains improved by other means. The farmer, for instance, generally knows tolerably well by observation which hens are the best layers. The birds which are on the nest in November and December, those which are the best foragers, and which are out earliest in the morning, and far afield scratching for natural food when the others are retiring to roost, are the most

WHITE LEGHORN HEN

Winner Verrey Trophy, value 20 guineas, for best Leghorn in show; and Poultry Club Trophy, value £30, for best female in show; Leghorn, P. R. and A. Club Show, 1904, etc., etc. The property of Messrs. Whitaker and Tootill.

prolific; and it is these that the intelligent poultry keeper will select to be the parents of his future stock. Equal care must be exercised in the choice of male birds, for, in breeding for laying, the sire must also be the offspring of prolific parents or all our efforts may be in vain. It is extraordinary how quickly fowls respond to this selective process, if it is faithfully carried out every year, and how the average egg yield will increase.

HATCH EARLY.—The chosen hens—the best layers—must be kept apart from the others and mated with the selected cock early in the year, so that the chickens will be hatched out in March or April. One of the main causes of the shortage of eggs in winter and the consequent loss sustained by poultry keepers is late hatching. Pullets must have attained a laying age by October if they are to be relied upon for egg-production the following winter, which means that heavy breeds, such as Orpingtons and Wyandottes, must be hatched in March; the light, non-sitting breeds, like Anconas or Leghorns, at the end of April; and cross-breeds of an active, precocious sort—such as those sired by a Houdan cock—in April also. It is quite hopeless to attempt winter egg-production with pullets that are hatched too late.

FOWLS ON GRAZING LAND.—The proper way to run layers on a farm is, as I have indicated, in movable houses in the open pastures, stocking the latter to the extent of about ten or fifteen birds to the acre. With that number the grazing will in no way be injured for other stock, in fact it is every day being conclusively proved by intelligent poultry-keeping farmers that a few hens evenly distributed over the land improve the grass to an enormous extent by ridding the land of moss, weed, noxious flies and grubs, and by fertilizing the grass with their manure, which is one of the most valuable plant foods yet known. The old antipathy shown by farmers towards poultry being run on grass has arisen through over-stocking, and consequent fouling of the land, but modern methods have proved that poultry, run in small colonies as I have suggested, can be the farmer's strongest ally and most productive stock. The hens help the land, and the land helps the hens by yielding an enormous amount of natural food—most of which is detrimental to crops—and which the birds convert into eggs. Thus the food bill is saved, the productiveness of the fields enhanced, and every one is better off. It has taken a long time for Hodge to see this; and it is only just beginning to dawn upon him now, but the facts are incontrovertible and the time will come when old superstitions and silly antipathies will be broken down, when every holder of grass land will consider his fowls to be, not insignificant outcasts, but allies that he could ill afford to be without. And on arable land, at certain seasons, flocks of hens or ducks do an enormous amount of good by devouring wire-worms, leather-jacket grubs and other pests which cost agriculturists tens of thousands of pounds every year, and

LAYERS ON PASTURE AT MR. C. D. MILNE'S FARM, WHALEY BRIDGE which are now only too often allowed to remain in the soil to work their irreparable havoc. The rooks and gulls which follow the plough are a telling indication of what a feast the upturned land yields. How much better would it be if the poultry were permitted to devour that natural food, which is the best of all foods for egg-production, when they would repay their owner many times over for the privilege? The field-houses must necessarily be moved from place to place at intervals, not only with the object of affording the birds "fresh fields and pastures new," but so that the better distribution of the fowls will bring about a more even manuring of the land. The labour of moving a house, say once a week, a few yards at a time, or from one field to another, so that the poultry will be properly accommodated to the condition or nature of the crops, is trifling compared with the results. Some hints on the feeding of fowls kept on the "colony" plan are given at the end of Chap. XII.

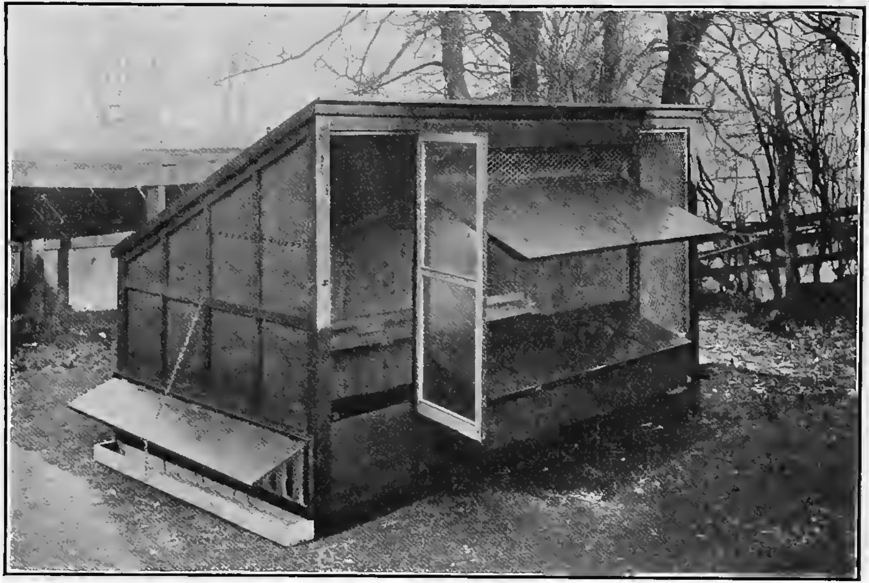
OLD HENS.—Before concluding this chapter I would urge the necessity of a more methodical weeding out of the old hens. These should never be kept after they are two-and-a-half years of age, unless they have some special features which one desires to perpetuate. Just before they go into their second moult (they should not moult in their first autumn if hatched at the right time) it is wisest to clear them all off, their places being taken by younger stock, for not only does the average hen become more unprofitable every year she lives after the age given above, but she gets tougher and less valuable for table. When large lots are to be sold at once it is best to send them direct to London, or other large town, and for this purpose they must be fat and heavy. With the object of increasing weight it is a good plan to pen them up for three or four weeks before marketing, feeding, during that period, largely on maize and barley-meal. The object in getting them as fat as possible is that the Jews, who are the principal buyers of this class of stock in the towns, prefer them in that condition. On the other hand, if the hens are to be used on the home table, or sold locally to private customers, scarcely any extra fattening will be necessary at that age, and it would certainly be inadvisable to feed on such foods as maize, which produces such a preponderance of gross internal fat.

CHAPTER X

HOUSES AND RUNS

Before proceeding further, it would be well to give the reader some general hints upon the housing and penning accommodation for poultry. A few years have witnessed many very remarkable changes in these matters, and the houses in use to-day are often quite unlike those of about a decade ago. If we were to compare a present-day appliance maker's catalogue with one ten years old, the feature which would strike us most forcibly is the open front to the houses. Practically all the older houses were only ventilated by eave and ridge ventilation—which was quite insufficient, leading to all manner of diseases—then there came small windows covered with wire netting, with wooden shutters. Later on these windows were gradually enlarged, as the evolution of the poultry-house proceeded, until they occupied, as they do to-day in all the best houses, at least half, and sometimes the whole, of one side, or front. And we wonder now how we ever could have tolerated the old closed-up patterns, which bred the germs of roup, weakened the constitutions of the birds, and were the most frequent cause of colds and pneumonia.

OPEN-FRONTED HOUSES.—In a properly made open-fronted house there can be no cutting draughts, because (all sides but one being closed) there is no through current of air, and yet the atmosphere is pure and wholesome. The adjustable shutters, which, for preference, may be made of oiled canvas—which admits



MR. BERTRAM PAYNE'S "U.P.C." SCRATCHING-SHED AND LAYING-HOUSE

Showing open front and dropping-board

air and light, but prevents driving rain and snow from entering—are fitted in a variety of ways, according to the special requirements of the house. But not the least advantage afforded by the open front and porous shutters is that the house fitted with them can do duty as a scratching-shed, as well as roosting-place.

SCRATCHING-SHEDS.—With the great advancement made in egg-production of late years, an efficient day shelter, a place which was light, dry and well littered, was found essential, and scratching-sheds were adopted to meet that requirement. Sometimes the latter are made as separate erections, but it is now more often the custom to combine them with the sleeping-compartment, by simply adopting a more roomy building and providing it with ample light and air.

By the proper use of scratching-sheds, more especially in winter, there is no doubt that the egg-yield can be increased at least thirty per cent., for they afford a dry, wholesome place in which the birds can exercise and obtain diversion, by searching for a few grains of corn scattered in the litter, when they would otherwise be dozing on the perches or moping in a cold, damp corner of the run.

LITTER.—The best litter to use in poultry-houses (which should always be floored) is peat moss, but there are other materials, viz. dry leaves, the husk or chaff which the threshing machine winnows out of the corn, straw or fern chopped into coarse lengths; and dry earth. The latter is best used on the floor as a foundation for the warmer litter, and it makes a good material in which the fowls can dust themselves. It is never a good policy to stint the supply of litter. Put it down six or eight inches deep and it will last nearly as many months—especially if it is peat moss—with an occasional turning over. A thin layer of litter soon gets foul and is most uneconomical.

DROPPING-BOARD.—A dropping-board, which is a wide, movable shelf placed under the perches, and which prevents the manure deposited during the night from fouling the litter, should always be used. It saves the labour of cleaning out the house more frequently, which would be necessary were it not used, and the unadulterated manure, if removed daily, or every other day, and stored in a dry place, is a valuable product which every poultry keeper must look upon as an asset.

SIZE OF HOUSES.—Most poultry-houses sold in these days are built on right principles, so that the beginner cannot go far wrong in his choice. But he may be tempted, on account of the low price, to go in for those which are too small for his requirements, and, though it is not easy to say precisely how much space a fowl requires, because birds and circumstances differ so widely, I am prompted to warn him against such a policy. Under average conditions, it is desirable to allow, for houses that have to do duty as scratching-sheds by day and roosting-places by night, not less than ten cubic feet of air space and two square feet at least of floor space per bird. And I may again emphasize the necessity for keeping the flocks small. The dimensions given above only refer to a limited number of birds, and the reader must not suppose that, provided he supplies ten cubic feet of air and two square feet of floor space to each individual, he can keep as many birds as he likes in one flock. Large numbers may—the ventilation being ample and of the right kind—be under the same roof, if need be, but the interior of the building must be divided into sections, each of which is in connection with its own outside run, and each containing its own flock.

COVERED RUNS.—When it is desired to keep a few fowls in a very limited space with the object of providing the household with eggs, the house and run may be both covered over and under the same roof. This would be merely a scratching-shed on an enlarged plan, and half-a-dozen birds can be kept very profitably in such a place if cleanliness is maintained and other points of management duly carried out. And the reader may be reminded that it is the person who keeps a few fowls in this way who is generally able to make the most profit per bird, and to show the highest egg-average. Another of the methods adopted for keeping birds in a very limited space is that of providing a run (attached to the house) of some hard material, such as concrete, or some similar substance. This can be easily cleaned by an occasional wash over with a bucket of water and hard broom, which entirely does away with any likelihood of contamination. A small grass run can never be kept sweet enough for permanent occupation, for it is impossible to remove the manure, which has become part and parcel of the soil, except by cropping, and the same may be said of earth runs, though, as I shall presently show, the latter are more amenable to treatment than those of grass. I have no hesitation in saying that, whenever there is only sufficient space for quite a small house and run, the latter should either be an extension of the house or made of some hard material, like concrete or asphalt.

LAYERS ON SMALL HOLDINGS.—In these days of allotments and small holdings, the value of poultry as an adjunct to one's undertaking is daily becoming more evident. But instead of keeping the birds permanently in one pen, people who go in mainly for gardening often find it better to run the stock on the land in conjunction with the crops.

GARDEN RUNS.—For example, supposing the plot of land to be utilized for gardening purposes were to have a large house placed in the centre of it, this could be divided and sub-divided into various compartments, each one being large enough to hold about eight birds. The

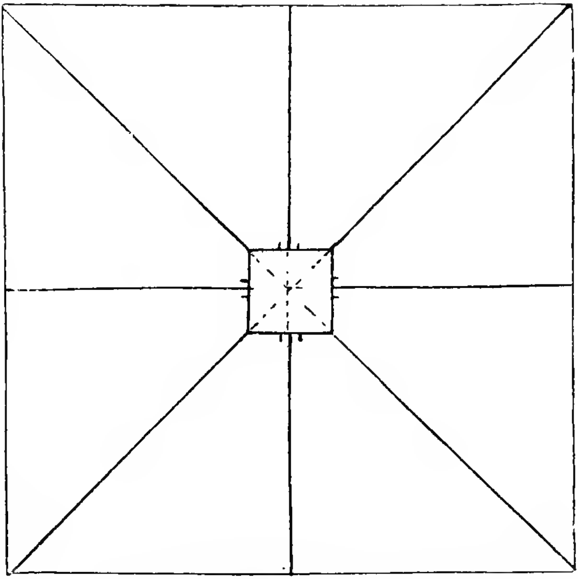


FIG. 1.—GARDEN POULTRY-HOUSE AND RUNS

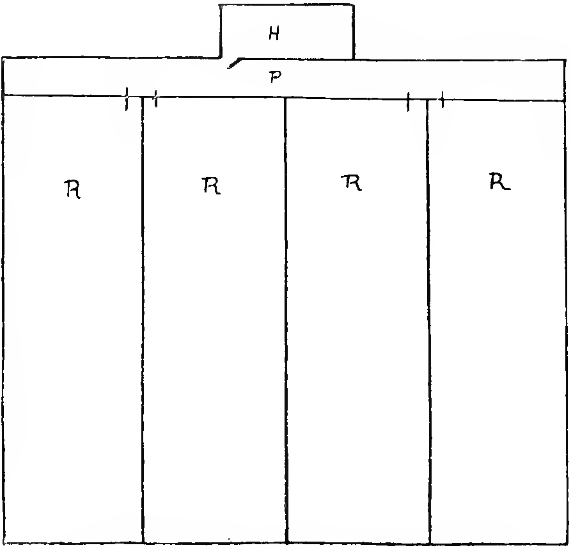


FIG. 2.—H. HOUSE. P. PATH. R. RUNS

pens would radiate from each section of the main building (see Fig. 1), and these need not be extensive, because, only half or one-third of them being occupied at a time (the others being under crops), a frequent change of land would be possible. During the period of occupation—say three or four months—the ground should be frequently dug over, so as to bury the manure and give the birds additional facilities for finding noxious grubs. By devouring the latter, laying will be improved, the food bill saved, and future crops spared from attack by insect pests. The land will also be so well manured by the stock, that any further trouble and expense in that respect will be saved—and no one knows better than the gardener what a heavy item manure is when it has to be bought. Thus the poultry and crops will be run in rotation in the pens, and one will materially help the other.

If such an extensive system is not desired, movable fences can be erected around vacant plots of land, upon which flocks of layers, fattening stock, or chickens can be run at certain seasons. Another plan favoured by some who only keep one flock of birds is shown in Fig. 2. Here the house is erected so that it opens into a conveniently wide path or run from which the birds may gain access to any one of the adjoining plots of land by simply leaving the gate leading to it open and closing the others. Any of these systems may be varied to almost any extent by any intelligent person, so as to fit in with his particular circumstances; and enough has been said to show what possibilities there are in this direction.

CONFINED GRASS RUNS.—As a general rule, it does not pay to run utility poultry in confined grass runs, but if some crop can be realized off the same land, the matter assumes a different aspect.

Turf, as I have pointed out, is more easily fouled than any other kind of land, and one would have to allow quite

100 square feet per bird on a permanent run of this nature if it is to remain sweet. But if we were to break up an acre of grass into several pens, as recommended above for garden land, and carefully crop one half of the pens each year with hay, while the other half were being occupied, it would be possible to keep the stock healthy on a very much smaller area per bird. Everything depends upon the repeated mowing of the vacated pens (and even of those in occupation, if the grass is long enough for the scythe) and the clearing away of the crop, which often amounts to no small item of revenue. Fruit trees, too, can be profitably grown in such runs, and they will, if properly attended to, be a source of income and afford shelter for

[*By the courtesy of " The Illustrated Poultry Record "*

A French Amateur's Yards

Note the fruit trees in the runs

the birds, which, in their turn, will manure the roots and devour the destructive flies and grubs which so often render fruit orchards valueless.

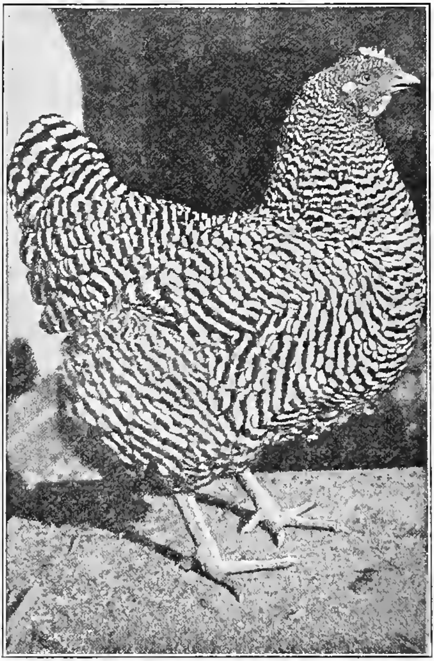
In concluding this part of my subject, I would again impress upon every beginner the necessity for allowing plenty of space in his houses and—except in the case of fattening stock—as much range as possible. The smaller the run so much the greater should the area in the house be; the necessity for space in which the birds can exercise themselves indoors increases with the decrease of the outer run. And not less important than floor space is dryness underfoot. Damp litter, or manure, emits poisonous gases, and a foul, unwholesome air is the result. But a well-littered floor, kept perfectly dry, is always sweet and fresh, particularly if peat moss is used, for it is an effective deodorizer. Quicklime should not be sprinkled about the houses or runs which are occupied, for two reasons: it liberates the ammonia from the manure, thus robbing the latter of its most valuable plant food, and, if new lime is eaten by the birds, it is likely to bring on very serious outbreaks of enteritis. The only really effectual way of sweetening the pens is, as I have already stated, by cropping and a frequent interchange of ground, but a dressing of lime on a vacated run, previous to cropping, is generally helpful. To apply liquid quicklime to the walls with a brush or garden syringe is quite another matter; in fact, it is, or ought to be, a part of the poultry keeper's regular work, to be carried out twice yearly, *i.e.* in spring and autumn.

CHAPTER XI

FOODS AND THEIR USES

Before he can feed both economically and well, the poultry keeper must be conversant with the various properties of foods so that he may know how and when to use the latter to the best advantage. He must understand why one diet is good for summer feeding, another for winter, and he must realize the requirements of a laying hen with regard to food, as differing from those of a fowl that is being fattened. To enable him to do this I first propose to divide those foods generally in use into a few broad sections, according to their relative values from a feeding point of view, and then to proceed with some practical suggestions upon the actual preparing and serving of the food.

ANALYSIS OF FOODS.—During the last few years chemical analysis has thrown much light upon the constituents of foods, but rather than enter too deeply into the subject, which would only perplex the beginner, it will suffice here to state that all articles of diet may be classed under three heads, viz. albuminoids or flesh formers, carbo-hydrates or warmth and fat promoters, mineral salts, for bone making and assisting the digestive processes and other functions. Then there is always a percentage of husk, or indigestible matter, and water in all food, but these need not concern us here. The most important of the above are the albuminoids, or nitrogenous compounds—what we term "nourishing foods"—and we have already seen that the white of an egg is almost pure albumen and water. This ingredient is mainly used by the body to replenish waste tissue, to produce eggs and promote growth of bone, flesh and blood. Albuminoids are most abundant in lean meat, oats, oatmeal, peas, beans, bran (of best quality) middlings and some green foods, such as clover. Carbo-hydrates, or carbonaceous foods, comprise all those which sustain the heat of the body. They are to the body what coal is to the engine, for they are the fuel which maintains that warmth



[*By the courtesy of "The Reliable Poultry Journal," U.S.A.*

A USEFUL ALL-ROUND BREED. PLYMOUTH ROCK HEN
Owned by Mr. C. H. Latham, Lancaster, Mass.

necessary to support life. Broadly speaking, these heat-forming foods consist mainly of starch, of which maize, or Indian corn, wheat, potatoes, barley and rice are largely composed, while animal fat, milk, and such oily grains as linseed, hemp, and sunflower-seed may be placed in the same category. Mineral salts, which, as stated above, are essential for maintaining the health of the digestive functions, for promoting the development of bone and the shells of eggs, are present to some extent in most meals and grains, but more especially in bran, or other products of wheat. Poultry also obtain this necessary mineral from old mortar, broken shell, fine cinders, and other earthy matter. Now the intelligent reader who gives these statements—brief as they are—due consideration will not need reminding that a fowl requires a proportion of all the above ingredients if it is to be naturally healthy and vigorous, but what proportion of each should be allowed is by no means so clear. Indeed, it is because of the ignorance which is displayed by poultry feeders upon this matter that much of the failure to make fowls profitable is due.

A BALANCED DIET.—A diet should be so balanced, or apportioned, that it consists of about one part of albuminoids (by weight) to six parts of carbonaceous foods, always remembering that, of the latter, fats or oils are more fattening than the true carbo-hydrates such as the starchy products. For ordinary every-day work, however, it will be sufficient to bear in mind the above ratio, and with the table showing the composition of the various foods before him the beginner should be able to proceed fairly accurately. But the feeder must never allow himself to drift into the habit of preparing his foods in a mathematical kind of way, for we shall see that while a ratio of 1 : 6 may do for normal conditions, it must ever be varied when occasion arises.

In considering, first, the requirements of a laying hen and a growing chicken—which may be classed together—the feeder must consider that, in the case of the former, which produces an egg comprised of nearly two ounces of highly concentrated food every day, or every alternate day, a large proportion of nourishing or albuminous diet is essential. She must get albumen if she is to produce eggs, and it must be in excess of what she requires for the upkeep of her body. Unless the fruit tree is nourished it cannot produce fruit, and if the hen is not able to procure sufficient nourishment over and above the requirements of her own body she cannot yield extra products in the form of eggs. The growing chicken requires its albuminous matter to build up its own body, and it must have enough to enable it to do this, *plus* that which is required to replace the loss of tissue which is ever going on. And in both cases, as I have shown, a proportion of warmth-promoting foods and mineral matter are essential for their respective purposes. But supposing the feeder were to give a hen that was not laying a highly nitrogenous diet, the result would be that the surplus food, which she would otherwise have turned into eggs, would be converted into fat which, if the bird were not intended for market, would indicate loss. Again, take the case of a hen that is wrongly fed, say on maize meal, which is rich in fat-forming ingredients and deficient in albuminoids; she would have to eat so much to enable her to produce eggs, or to even maintain the upkeep of her body, that the large surplus of starchy matter would be secreted as internal fat, which would be detrimental to health and egg-production. On the other hand, a hen may be perfectly fed as far as her bodily health is concerned, but her productive faculties might, at the same time, be literally starved by an insufficiency of the proper kind of food. It may be that she has been laying well for some days when, with a sudden spell of cold weather, she abruptly ceases. Why? Because the albuminoids she was hitherto using as surplus for making eggs became, with the lowering of temperature, converted into fat for maintaining the warmth of her body. But if, when cold weather set in, she was given a little extra fat, meat or starchy grain, to enable her to still have a sufficient surplus of albuminoids for the production of eggs, after the requirements of the body had been fulfilled, she would probably never have ceased laying at all. Thus the reader will understand how essential it is to study the requirements of his stock, the conditions under which they live, and especially the climate or temperature.

GRAINS.—Of the three principal grains grown in this country, viz. oats, wheat and barley, the first-named is without question the best for laying fowls, both in its whole state or when ground into meal. It is, as the analysis shows, rich in albuminous (flesh-forming or egg-producing) foods, and has a nice proportion of both fat and mineral salts. The husk is indigestible, and therefore rather unsuitable for young chickens, but groats, which is the whole oat with the husk removed, or oatmeal are both excellent for stock of all kinds, though rather too expensive for adults. In fact, the oat is almost a perfect food in itself, and all who go in for egg-production should use it. Some samples are naturally better than others, the short, fat grains, which weigh about 42 lbs. to the bushel, being the best. Wheat comes next, and it is a very close second. Being richer in mineral salts than the oats, as the analysis of its product, bran, clearly shows, it is a first-rate food for growing stock, and for this purpose tops the list as a grain. Its only drawback is its cost, which for some time has been high, from a feeder's point of view, but whenever it can be bought at a reasonable price no poultry keeper should be without it. Barley is a poor food for layers and, for that purpose, cannot be recommended. It is, however, useful as a change in cold weather (being of a heating nature) and both it and barley-meal are a great help in preparing all classes of feathered stock for market.

ANALYSIS OF POULTRY FOODS

FOOD	Water	Albuminoids or Flesh Formers	Fat or Oil	Carbo-hydrates, Heat Producers	Fibre	Ash	Feeding Ratio
Wheat . .	12·4	11·7	1·8	70·0	2·4	1·7	1 to 6·3
Maize	11·0	10·4	5·1	70·0	2·0	1·5	1 ,, 7·9
Oats	14·0	12·9	6·0	56·4	19·0	2·7	1 ,, 5·5
Barley	14·0	9·0	2·0	68·0	5·0	2·2	1 ,, 6·5
Rice	14·0	5·0	1·0	77·0	2·4	0·6	1 ,, 15·9
Peas	14·3	22·4	2·0	52·5	6·4	2·4	1 ,, 2·5
Millet	14·0	12·7	3·3	57·5	9·5	3·0	1 ,, 5·2
Dari . . .	12·5	10·0	4·0	68·0	3·3	1·3	1 ,, 7 8
Buckwheat . .	14·0	9·0	1·5	58·7	15·0	1·8	1 ,, 6·9
Hempseed . .	8·0	10·0	21·0	45·0	14·0	2·0	1 ,, 9·2
Canaryseed . .	9·5	17·3	19·8	33·5	8·6	6·1	1 ,, 5·0
Bran	14·0	15·5	4·0	44·0	16·5	6·0	1 ,, 3·5
Middlings .	12·1	15·6	4·0	60·4	4·6	3·3	1 ,, 3·9
Dried Meal . .	10·7	71·2	13·7	0·3	0·0	4·1	1 ,, 0·5
Malt Culms . .	10·2	23·2	1·7	48·5	10·7	5·7	1 ,, 2·2

By the courtesy of the Editor of "The Poultry World Annual."

MAIZE.—The only other grain which need be given special mention here is maize or Indian corn. This is generally found in two kinds—the round and the flat. The former is a most un-economical diet and should always be discarded in favour of the larger and richer grain. There is a great deal to be said both for and against the use of maize. It is, under some circumstances, a dangerous food to use, while under others it is wholesome and valuable. Its analysis proves it to be very rich in fat-forming constituents and deficient in nitrogenous compounds. It is heating and stimulating, and the feeder who bears that in mind can use it as occasion serves. In very cold weather, or for laying hens or young stock which are much exposed, it is most useful as a part of the daily food, but to use it, as so many people do, year in and year out, irrespective of conditions or circumstances, is nothing short of folly. Maize, like other good things—alcohol, for example—is of inestimable value when used in the right place and in the right way, but feed it excessively, or when it is not required, and it becomes literally poisonous. Four-fifths of the hens kept in small yards, which become diseased, which develop such vices as feather-eating and are such a constant source of worry to their owners because they seldom, or never, lay, are the victims of maize-feeding. Hence we find that this grain is invariably condemned by many writers to the poultry press and others, but it, nevertheless, has undoubted qualities of which every intelligent poultry keeper should make proper use. "Mixed fowl corn," as often retailed by local dealers, is generally worse than useless, for it not only contains too great a proportion of round maize but a great many grains that are of bad quality and unwholesome.

MEALS.—The various meals, which are the product of the grains mentioned above, naturally have the same feeding properties respectively as the latter, though the effect of grinding very considerably aids digestion. Food that is so far prepared for assimilation loses no time, as it were, in passing directly into the system. Hence the wisdom of using soft food for fattening, for young chickens, and as a first meal in the morning for other stock. A study of the analysis of foods (page 94) will at once point out to the reader that there are a number of meals which are eminently useful, quite apart from those in daily use. Bran and pea-meal, for example, are not fed as much as they should be to layers, as they are very rich in nitrogenous compounds, and linseed meal, which every cattle breeder values so highly, is not used as frequently as it should be in the poultry yard. As it contains a large quantity of oil, it is obviously only a food that can be used to promote warmth in cold weather when feeding layers, but as an aid to fattening it is remarkably efficacious. Biscuit-meal and meat-meal are, as their names imply, formed of biscuit and dried meat, respectively, but both are rather expensive for the ordinary poultry keeper when feeding adults. With the analysis of foods before him the reader will not require me to dwell upon the subject further, but a word or two should be added here upon the value of green stuff, which includes cabbage, lettuce, tender grass, onions, clover, and such roots as carrots and turnips.

GREEN FOOD.—This class of food, as a part of the daily fare, is absolutely essential to health, and all birds which cannot procure it for themselves must be given a regular supply. And the closer the confinement so much the more fresh green vegetable do the fowls require. A great many failures in poultry-keeping may be attributed to lack of green food alone, and there is no poultry keeper who can afford to ignore that fact. This kind of food is usually given in the raw state as a noon-day meal, but there is a wrong way and a right way of giving it. It must not, for example, be thrown down in a dirty pen, and long, tough bits of grass or loose cabbage leaves only get trodden underfoot while the birds endeavour to detach suitable pieces for swallowing. Such scraps of green food, including turnip tops, garden weedings and such like (but excluding long grass, which is useless and harmful) ought to be suspended about eighteen inches from the ground in a string net. Cabbage and lettuce may be hung by the stalk at the same height, and that will enable the birds to detach suitable pieces with ease without soiling the vegetable. It will, moreover, afford confined stock both exercise and diversion, especially if hung a few inches out of reach so that the birds must jump to reach it. It is essential that this food be given fresh, but it may be boiled and mashed, or minced, as an addition to the morning mixture.

[*By the courtesy of "The Illustrated Poultry Record*"

FEEDING THE FIELD LAYERS

POTATOES.—There is only one other vegetable that needs special mention here, and that is the potato. This is a vegetable very rich in starch, in fact it is practically nothing but starch and water, so that it is fattening and warmth-promoting without being nourishing, from an egg-producer's point of view. With other meals the homely tuber is of great assistance in fattening stock, and in cold weather it may be given to layers and young birds, provided it has a large proportion of good bran or middlings, which are highly nitrogenous, mixed with it. Peelings alone are not a good food to use, and the water in which potatoes, with their skins, are boiled, should always be strained off and thrown away before mashing. Potatoes are generally cheap, which is a great point in their favour, but they must, like maize, be used with discretion.

ANIMAL FOOD.—Poultry being animal as well as vegetable feeders, some meat is essential to prolificacy and health, except when the fowls are at liberty in summer, when they can obtain for themselves a sufficiency of insect life, worms and grubs. But the poultry keeper must make up his mind that, for the greater part of the year, more particularly if the stock is penned, meat must be regularly fed if the best results are to be attained. Butcher's scraps should first be boiled and then minced, or raw bones (called "green bone") passed through a cutter. These latter are the best stimulants for egg-production yet known, but it is desirable to use all such food carefully for fear of over-stimulation, which is just as detrimental as the reverse. It is difficult to lay down any hard and fast rules as to the amount of lean meat to use, for everything depends on the condition of the birds, the temperature (more being required in cold weather or in exposed runs) and other circumstances.

A fowl that is at liberty, and laying, will generally eat as much meat food as she requires, which is more than twice as much as one which is not laying should have, and, with the former, there is not much fear of over-doing it. But another fowl which consumed the same quantity might, as pointed out on a previous page, convert her surplus into internal fat instead of eggs, with evil results. Thus it will be obvious that the feeder must study the conditions of his birds and, as far as possible, keep all those which are laying, or about to lay, apart from the others. And in regulating the quantity of meat—which may be anything from $\frac{1}{2}$ oz. to 2 oz. per bird every day—he must also consider the nutritive value of the particular kind of meat in use. Of the latter there are many "prepared" kinds on the market now which are fairly cheap, easy to use, and the makers usually supply an analysis with each sample for the guidance of the feeder.

WATER.—In concluding this chapter I would emphasize the necessity for a regular supply of pure water, kept in a covered vessel, or "fountain" of some kind, with a "lip" from which the fowls can drink. Always choose a "fountain" that can be easily cleaned inside, and do not let it stand in the sun. Fowls are very thirsty creatures, especially when laying (for eggs contain a large proportion of water), and if the water supply is irregular or unclean ill-health is sure to follow.

GRIT AND LIME.—Grit is to fowls what teeth are to animals possessed of them, for it grinds the food in the birds' gizzards and prepares it for assimilation by the system. The digestive organs and the entire health of the bird are impaired if grit is not supplied, and the latter must be sharp and of a suitable size. Do not mix grit with the food, but place it in shallow boxes for the fowls to help themselves. Supply also plenty of broken shell in the same way, or a heap of old mortar for purposes already mentioned. New lime is dangerous if eaten, and should not be left about the runs.

CHAPTER XII

WHEN AND HOW TO FEED LAYING HENS

WITH the knowledge gleaned from the previous chapter the inexperienced poultry keeper will now know what foods he requires for his stock. But possessing the food and knowing how to prepare it and to give it to the birds are very different matters. And it is my intention here to offer a few hints as to how a dietary may best be arranged for layers which will be both efficient and, in the truest sense, economical.

With the object of making these hints as useful as possible it will be wisest to consider first of all the feeding of small, confined flocks and then proceed to discuss this subject as regards larger undertakings.

THE HOUSEHOLD FLOCK. — In feeding the household flock one must first bear in mind the great evil of allowing the birds too much to eat. It is bad enough to feed hens at liberty too well, or too heavily, but it is ten times worse with those in confined runs. An overfed hen is not only well on the way towards disease —especially derangements of the liver—but she cannot possibly lay satisfactorily.

USE OF SCRAPS.—The best staple diet for these layers may consist of a breakfast of house-scraps passed through a mincer and then mixed with some best broad bran and middlings. A large quantity of potato and white bread should not be used, and one must carefully regulate other highly fattening ingredients. It is a good plan to boil the scraps, with a slight seasoning of salt, overnight, putting with them any leaves of vegetables, or such roots as turnips or carrots, and in the morning they may be mashed together with the above meals until the whole mass is reduced to a crumbly consistency. But if the mashing will not break up the scraps into bits which the fowls can swallow easily they must be minced, for this reason. If any long pieces of bacon rind, or other tough material, are given with the food they will not only be dragged about the run, but while one hen is endeavouring to break up, or swallow, one of these morsels the others are finishing up the breakfast, with the result that she may go empty. The necessity, therefore, of mincing need not be further touched upon. If the scraps are insufficient middlings may be increased to make up the deficiency and some ground oats added. The two last-named meals, in equal parts, make a good diet in themselves if mixed crumbly—not sticky—as all mixtures should be. Under average conditions water is the best liquid with which to mix the meals, but buttermilk is excellent, especially in summer. During severe weather meat liquor may be used with advantage.

Maize-meal (ground maize or Indian corn) should never be used for fowls in small runs, except as an occasional treat in very cold weather. But even then it should be well scalded beforehand and have bran mixed with it. The latter (which must always be of best quality) is, or should be, the small poultry keeper's sheet-anchor, for with it he can reduce the fattening, or heating, property of his mixtures at any season, and it provides the birds with those compounds which they require the most.

The breakfast of mash should always, in the case of penned fowls, be fed in a trough, and the birds must not be allowed to gorge themselves. Give sufficient, say a good tablespoonful to each bird, but not enough to make the flock drowsy and inclined to go to roost again. They must, after clearing all up (if any food is left they are being over-fed), still have a little appetite left to induce them to take exercise by scratching in the litter for a handful of grain scattered therein for that purpose. And this is a most important point in the management of all fowls: they must be kept active. If a laying hen gets plethoric and idle it means that she will very soon cease to be profitable. She must be kept in good hard condition and rather to the lean side than the reverse.

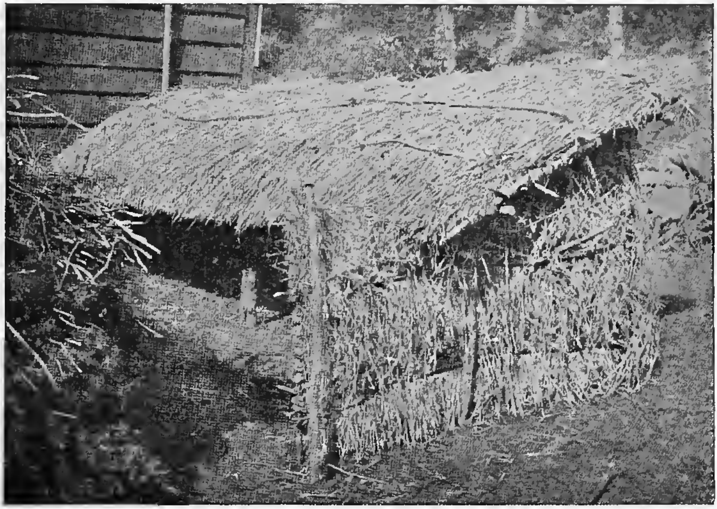
At noon some green-stuff must be given *ad lib.* and regularly, but no other food is required at that hour unless it be a little chopped lean meat, or "green" bone, as a stimulant, when required, for egg-production.

GRAIN FEEDING.—Then, before the birds go to roost, a feed of grain—preferably best heavy oats—should be given scattered in the litter. Allow a handful, grasped with the palm downwards, to each hen under normal conditions and give sufficient time for the birds to find the grain before dusk sets in. If it is fed too late in this way the stock may, for obvious reasons, go to bed hungry.

Fowls for laying, or young stock kept in larger premises, may also be fed as recommended above, but with them it is needful to go in for a wider range of foods to take the place of the house-scraps, which are usually insufficient except for quite a few birds. It is true that many people are able to obtain the refuse from hotels and restaurants which, if clean and fresh, are excellent and may be prepared and fed just as though they were household scraps. Anything of a sour or doubtful nature, however, must be discarded or serious outbreaks of cholera, or enteritis, may be the result.

A CHANGE OF FOOD.—For a change of diet—and it must be remembered that a variety of food is appreciated by the fowls just as much as by ourselves—

supposing the staple mixture to be one of ground oats and middlings, or the latter with house-scraps, the following may be recommended for layers kept in average-sized runs. 1. Boiled vegetables (excepting potatoes) mashed with middlings, ground oats and a little meat-meal. 2. Maize-meal and best broad-flake bran in equal parts in bulk, scalded and fed when cool. This can be mixed crumbly with coarse middlings if too sticky. 3. Boiled potato, mashed while hot with plenty of good bran. Some linseed-meal may be added in cold weather. 4. Equal parts middlings and barley-meal mixed with buttermilk or water. Some fat improves the feeding properties of this food in winter. Meat or green bone must be given when desirable, and green food is just as important in large runs, when the birds cannot procure a sufficiency for



[By the courtesy of the "Illustrated Poultry Record"

A CHEAP BUT USEFUL WINTER-SHELTER

themselves, as it is in the backyard shed. Then there are several other important articles of diet such as clover-meal, cut clover hay, malt sprouts, brewers' grains, bean- and pea-meal, and separated milk—many of which can be procured cheaply as local products—which deserve the attention of all feeders.

The warnings as regards over-feeding which I have already uttered apply equally when layers are kept in open runs. They must never be so heavily fed that their appetites become dull and their lives indolent and lazy.

EXERCISE FOR LAYERS.—A properly fed hen should be always keen for the food, ready to scratch in the litter, and to forage for insect life. If the flock stands moping in a sheltered corner of the run, when the day is fairly fine and facilities for hunting natural food are afforded, there is something wrong with the feeding somewhere, and it must be remedied, or loss will accrue. When scratching-sheds are not provided there must be some other shelters (see p. 103) fixed up in which the hens can take refuge and scratch for hidden grains but, in fine weather, provided the nature of the run permits, a few handfuls of oats scattered among fallen leaves, grass or other growth, will afford the stock many hours of that recreation and exercise which is the very foundation of success in egg-production. The evening grain may be given in the same way, plenty of time being allowed for feeding, and, as a change from oats, wheat or buckwheat may be given occasionally with some flat maize cracked—when the temperature is very low.

FEEDING FIELD LAYERS.—In feeding field layers or farmyard hens, providing the flocks are kept small, allowance should be made for the supply of natural food that the birds are able to obtain. For instance, there are many weeks just after the harvest when no feeding at all will be required so long as the stubble

THE PROPER WAY TO FEED FIELD LAYERS
View on Mr. Toovey's Farm, King's Langley

yields sufficient grain. Then, again, in summer, or from April to October, layers on pasture, in colony houses, can do with one good feed of grain a day, the soft breakfast being discarded altogether. This, of course, is an enormous saving of the food bill, as well as of labour, and the birds are, at the same time, improving the pasture or the prospects of future crops. But in winter, when field-houses should be wheeled nearer home, a soft breakfast is very beneficial, and these birds, because they obtain a large amount of exercise and are often much exposed, require a more generous supply of meat than those in small pens—that is when they cannot get any natural animal life, owing to frost, snow, or other causes. In fact, layers in open fields which are much exposed often do well if fed largely on maize in very cold weather, and it is scarcely possible to give such birds, if laying, too much meat. Soft food and grain should, under these conditions, be thrown down on the grass at some distance from the house, a fresh place being used for feeding each day. The more the grain is scattered the better it is for the fowls and the land, but never, under any circumstances, should feeding be done close to the house unless it has been first moved to fresh ground.

"POULTRY POWDERS."—Perhaps it would be well to add here a final word upon the subject of spices and condiments, but this matter need not detain us long, for I strongly recommend the feeder to have nothing to do with such things as stimulants for egg-production. Condiments—"poultry powders"—have their uses on occasions to ward off colds, or to assist birds to withstand sudden changes of temperature, especially when moulting, but they do not materially help egg-production. For the latter, lean meat or "green bone" are the right things to use, when needed, and nothing has yet been discovered to equal them. Fowls in confinement, when given condiments, develop disorganized livers instead of eggs, and when poultry keepers whose fowls are kept in small runs begin giving stimulants to their unproductive birds, with the hope that they may, as the advertisements say, make them lay, they are only making matters worse. The hens are, nine times out of ten, already over-stimulated, and an occasional sprinkling of sulphur over the soft food often has a more favourable effect than any spices.

CHAPTER XIII

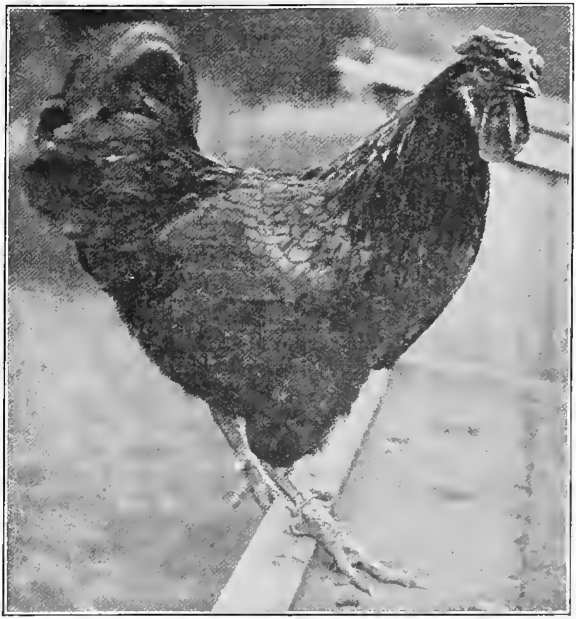
POULTRY FOR THE TABLE

If we take a broad view of the table poultry industry we find that it is in a deplorable state. The quality of the fowls, the manner in which they are fattened, and the preparations for marketing are a discredit to the poultry-keeping public of these islands. The egg industry is in a lamentable condition, but that concerned with the table poultry is infinitely worse. In some parts of England, notably the districts bordering on London, and the counties of Surrey and Sussex in particular, there are, no doubt, produced the finest table poultry the world has ever seen. But there the business, as already pointed out, is a speciality, conducted by trained men who have an almost instinctive aptitude for the work. These fatteners, as a rule, buy lean chickens from Wales, Ireland, and other parts of the country and feed them in cages, either by placing the food in a trough within reach of the birds, or with a cramming machine. Sometimes the birds are started with trough feeding and finished with the crammer. The food used is almost universally the same, and it consists of Sussex ground oats mixed into rather a sloppy consistency with sour milk. The reason the latter is given sour is that the birds keep more healthy upon it when in that condition, and no green-stuff or grit is given.

CAGE-FATTENING.—But it is gratifying to be able to record that cage-fattening is steadily increasing all over the country. Still, it is, as an industry, very far from what it might be. By adopting such a system more fowls can be produced than nine-tenths of the people of this country have ever dreamed of, and as they are of the very best quality, they naturally go to the best market. The ordinary person knows them not save as objects of curiosity in a shop window. But it may be argued that the average customer wants an average fowl, that he cannot afford to pay the big prices which the best cage-fattened birds can command. That is true enough in some respects, but if we consider the majority of birds that find their way to our markets and tables it must be admitted that they fall very far short of what even a fairly good table fowl should be. There are certain seasons when a home-bred chicken cannot be bought at any price and when we have to put up with a frozen Russian bird or go without. The foreigner has been quick to see our shortcomings and to make good use of them. He has stepped into the breach that we have failed to fill, though, as in the case of eggs, I do not think he will ever be able to compete with our first qualities. As matters stand at present we find that our provincial markets are insufficiently supplied with well-fed table birds, and that there is undoubtedly a good opening in most districts for the development of the industry.

But as it is doubtful whether the average poultry keeper, who annually sends his surplus birds to market, or even he who caters for a round of customers throughout the year, can ever be induced to go in for cage-fattening, the question arises whether there are not some other means by which good table birds may be produced. Most emphatically there are, and the poultry farmer need never despair of doing creditable work in this direction without the aid of the cramming machine and that peculiar aptitude and great experience which is essential in cage-fattening.

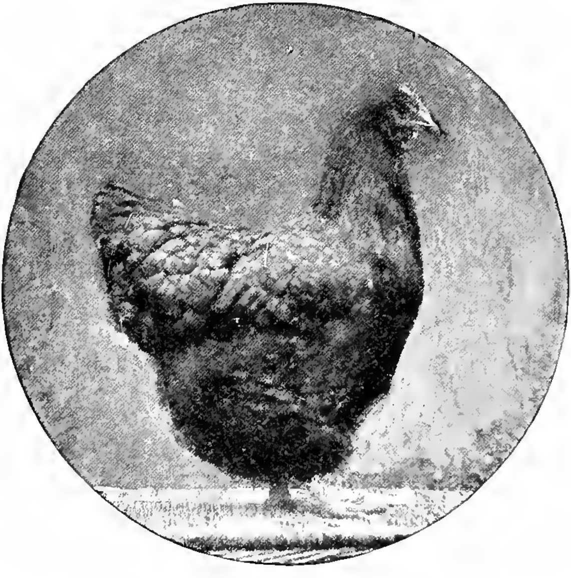
BREEDING FOR TABLE.—The ordinary, everyday table fowl can be improved beyond recognition by better breeding, feeding, and management. It has been suggested that people will not pay more for a carefully fattened fowl than they will for an ordinary specimen, and there is, unfortunately, a good deal of truth in the contention. A large section of the public require to be educated to appreciate the advantages of a fattened fowl over one that has not been fattened; for the former, seeing that it carries far more flesh—and that of better quality—in proportion to offal or waste, is unquestionably the more economical of the two. That fact has been recognized for



A Good All-round Breed. Black Wyandotte Cock
Owned by the Rev. Lewis Jones

long enough in regard to cattle, and it is incomprehensible why both producers and consumers of poultry have not also realized it.

This is not a place to deal with fattening as a separate industry, for which, as I have indicated above, special qualifications and long practice are necessary, but to the general poultry keeper, be he farmer or cottager, the following hints should be of practical assistance. In producing a good table fowl the first thing to consider is the breed. The specialist in Sussex can convert an Irish Plymouth Rock into a "Sussex Fowl," but not so the average, all-round poultry keeper. The latter must have material to work upon which will yield to simpler treatment, but which will prove to be efficient for his particular purpose. Any fowl will not make a table fowl, but any fowl, even the "barndoors," can be vastly improved, first by crossing, then by better feeding and management. The best male bird to use to enhance the table properties of cross-bred stock is an Indian Game, which, though rather heavy in bone, carries a flesh of rare quality, and all chickens with Game blood in them plump almost naturally, even when at liberty. Perhaps the Indian Game-Dorking cross is the finest that could possibly be desired, but the Dorking is a bad layer and the chickens are not quite so hardy as those of other breeds. I would prefer to use Rock, Wyandotte or Orpington hens with the Indian Game sire for this purpose. The progeny of the above would have the yellow-tinted skin of the sire but, although that colour is objected to by some people, it really makes no difference to the quality of the bird when on the table. In most parts of America—a country which is far ahead of all others in poultry culture—the yellow-tinted table fowl is preferred. There is one objection, and a very real one it is, that can be laid against the Indian Game in this respect, and it is this. Game are poor layers, and if the poultry keeper desires to produce an all-round fowl—one which will lay well and yet be presentable on the table—he must not use Game as a sire, for it will ruin the laying propensities of any strain. For such all-round work a Houdan is a better breed to use, for it is a good layer and table fowl combined, though it must never be supposed that the two propensities can ever be produced to any degree of excellence in the one breed. Each one militates against the other, with the obvious result—mediocrity.



[*By the courtesy of "The Illustrated Poultry Record"*

BLACK ORPINGTON HEN

A first-rate all-round fowl—good on the table and a hardy layer—is the Faverolles in its pure state. As it is a combination of Dorking, Brahma and Houdan blood—the latter preponderating as it nearly always does whenever it is introduced—it is only to be expected that a really useful fowl would be the result. A breed called the Sussex, which has much of the Dorking character in its constitution, has come to the front very rapidly of late years as an all-round breed excelling in table properties, and other useful fowls for this purpose are Crève-Cœurs, La Bresse and Coucou-de-Malines. But for all-round work the average poultry keeper will find a Houdan sire the best one to use.

SELECTION IN BREEDING.—Selection is almost as necessary in breeding table poultry as layers, for individuals of the same breed vary very considerably. Both sexes must be large, with long deep keels, or breasts, and the latter should always be straight. Crooked or indented breasts—the result of constitutional weakness and lack of bone-making material in the food—are an inexcusable fault in a table fowl. If the stock birds possess such a blemish it is nearly always transmitted to the offspring, so that a careful inspection of every individual is essential to avoid disappointment. Fowls with white legs are preferable to those with black.

Any one who intends making a speciality of fatted fowls should first serve a term of tuition at a fattening establishment, where he will become thoroughly conversant with the various modes of feeding. It is a business that cannot be learnt in a day, and only a practised hand can successfully turn out a presentable fowl. But for the sake of those who would like to experiment with cage-fattening, beginning in a small way with a few birds, the following hints are given, but practical lessons should always be taken before using a crammer.

FATTENING-CAGES.—Fattening-cages (see p. 168) are usually made somewhat like ordinary coops but standing on legs at a convenient height from the ground. The front of each cage—which latter is about two feet square to hold three or four birds—is made of upright bars of wood, and the bottom is similarly made, the strips of wood of the latter being rounded on their upper sides so as to allow the droppings to fall through. A V-shaped trough is fixed along the front to contain the food, which should consist of ground oats mixed rather wet with sour milk, or buttermilk. When the birds are first caged—say, at about the age of nine or ten weeks—they are left without food for at least a day, so that they are thoroughly hungry for the first meal. This gives their appetites a start, as it were, and great care must be exercised in maintaining that keenness for food throughout the process. Only practice can teach the feeder the amount of food to

[By the courtesy of "The Illustrated Poultry Record"

A SUSSEX FATTENING SHED

use but, briefly, the birds must have as much as they can eat twice daily, that which is left after each meal being taken away. At all times, save when feeding, a piece of old sacking should be hung over the front of the cage, and the latter must be placed in a quiet spot, away from the other stock. About ten days before marketing it is a good plan to add a little granulated suet or other fat to the food, giving a little at first and then increasing the quantity. This gives a "finish" and improves the quality of the flesh. No matter what system of fattening be employed, birds of the same sex and age only should be penned together, and any disturbances caused by bullying or fighting must not be tolerated. Quietness, cleanliness, general comfort and regularity with the meals are just as essential as the food itself for successful fattening.

ANOTHER METHOD OF FATTENING.—The poultry keeper who does not wish to go in for cage-fattening, having, perhaps, only a few surplus birds to prepare, should pen them up in a shed, or vacant hen-house, which has a dry, well-littered floor and ample fresh air. He may use the same food as recommended above, varying it with such mixtures as scalded maize-meal or barley-meal with middlings in equal parts; boiled rice, ground oats and middlings; boiled potatoes, animal fat, middlings and ground oats. Meat broth may be used for mixing, instead of sour milk or buttermilk, in which case a little green-stuff, minced and mixed with the food daily, should be allowed as a preservative of health. House-scraps may also be given, and any clean hotel refuse makes an appreciated and economical change. But such food should always be boiled, or scalded, and chopped fine with a mincer. Some grit may be given to these birds, but food requiring much digestion is not desirable. The two meals are best composed of soft mixtures, such grains as barley, wheat or crushed maize only being allowed as an occasional treat, and after they have been half-boiled, or steeped in hot water, over-night. The greatest care must be exercised in feeding to avoid sickening the appetites, which is easily done if too great a quantity of food is given at a time, and if the troughs are not picked clean after each meal. Some boiled fat, or other butcher's refuse can be added to the daily menu a few weeks before marketing time, and, instead of giving water to drink, supply a pan of separated milk, or buttermilk, once daily, say about an hour before the evening meal. There is nothing more helpful than milk in fattening, for it not only promotes flesh and growth but whitens and improves the quality of the former. And, though farmers and others know its value as a food for calves and other stock, it seldom seems to strike them that it would be good also for poultry.

FASTING THE FOWLS.—Whether the fatted fowls are to be sold first-hand to private customers or wholesale to market salesmen they must be thoroughly fasted for about thirty-six hours before killing. If this is not done the food remaining in the body quickly decomposes, with the result that the flesh is discoloured and often tainted by a disagreeable flavour. But if the birds are sold alive to a "higgler"—a man who travels round buying chickens alive—it is another matter, for he will see to the fasting if he markets his purchases in the dead state. In any case, and apart from the discoloration and impaired keeping properties of the fowl, the latter, if not properly fasted, will realize a lower price in the market than one that has been starved for the allotted period.

KILLING.—The best way to kill a fowl is as follows. Take the bird by the legs in the left hand and grasp the head (not the neck) with the finger and thumb of the right. The body of the fowl may rest upon the knee for support. Then with a downward and outward jerk of the right hand the vertebræ of the neck will be severed close to the head. There can be no pain, for death is instantaneous, and the blood, the fowl being suspended by the legs, quickly drains into the cavity between the broken vertebræ and the head. This method is more humane and infinitely cleaner than any other. As soon as the muscular action of the bird has ceased, which will be in a minute or so, plucking should be commenced, for this operation is more easily performed while the bird is warm.

PLUCKING.—A good deal of practice is necessary before one can become a proficient plucker, and the novice must not be disheartened if he tears the skin when undergoing his first attempts. The best way is to begin slowly and patiently, being content to allow practice to bring celerity. It is a subject that cannot be learned by any other way, for, like milking, there is a certain knack in it which is not easy to explain. I prefer to place the bird on its back, upon the knees, the head hanging over towards a receptacle to hold the feathers. First, the stiff quills from tail and wings are drawn out and put on one side, for they are of no value, and then, beginning at the neck near the head, the soft feathers are removed. It is while plucking these that the skin of the bird is most likely to tear, and to prevent that the finger and thumb of the left hand should grasp the skin just at the roots of the particular feathers which it is desired to draw. The latter are then smartly plucked in the direction in which they are growing, and if the skin is held firmly by the other hand, and not more than one or two feathers pulled out at a time, tearing of the skin will be avoided. When all the feathers are off, the "stubs" or immature feathers must be removed, and this is best done by first placing the bird so that its head is towards the operator, when, by using the edge of a blunt knife against one's thumb, the smallest "stubs" can be grasped and drawn out without difficulty. The next process is to singe the carcase, the object being to remove the fine hairs which grow, more or less, all over the skin. This is simply done by taking the bird by the head and the legs and passing it quickly, two or three times, through the flame of some burning paper. The charred ends of the hairs being wiped off, the operation is finished, and the only precaution needed is to avoid smoking the skin.

SHAPING.—If it is desired to excel with table poultry and to make the most of a fatted fowl it should be shaped. The object of this is to depress the keel bone so that the carcase may not only look better but that all the available meat may be forced upwards to where it is most wanted—which is on the breast. To achieve this a V-shaped trough or shaping-board, with one side more vertical than the other, is used, in which the fowls are placed, breast downwards, side by side, the legs being tucked in to the sides and the heads hanging over the front of the trough. Then a plank five or six inches wide is placed upon their backs and weighted, so that it forces the carcases down into the trough, where they are left for some hours to cool. When taken out they will be transformed in appearance and ready to pack or to truss. The breast bones should never be cut or mutilated in any way; to do so is not only dishonest because it makes the bird look fatter than it really is, but it annoys the carver. Shaping is not a practice adopted with the intention of deceiving the public eye, but it gives a good fowl its fair due and, as I have shown, enhances its value on the table.

PACKING AND GRADING.—A fowl is never fit to truss, neither should the carcases be packed for transit, until quite cold and set. Some hints as to packing for market will be found at the end of the book, and I need not do more here than emphasize the necessity for grading the carcases and keeping them clean and in a cool place. By grading, I mean the sorting out of sizes and qualities into separate lots, for if this is not done the best fowls will generally only fetch the value of the inferior ones placed with them, whereas, if they are separated, each quality will realize its full market value. The foreigner has taught us that lesson, not only in poultry and eggs, but in the fruit, vegetable and other markets.

The small poultry keeper who does not go in largely for table fowls may market his birds without shaping, as he may fatten them without caging. But he must be just as particular as the specialist as regards cleanliness in plucking and handling. It generally pays him best to sell direct to the consumer, in which case the birds must be drawn and trussed.

TRUSSING.—This process is a more difficult one to describe on paper than it is to learn, and the reader anxious to know how it is done will grasp more of the subject by five minutes' practical demonstration, say in a poulterer's shop, than all the descriptions ever written can teach him. Furthermore, many districts have their own particular method, or fashion, and wherever he happens to settle down the beginner will be wise to adopt the method in vogue in his particular locality. He must not expect to be able to truss a fowl quickly or well at the very outset. "Practice makes perfect," and the industrious worker will soon overcome the initial difficulties if he is persevering and means to succeed.

Every poultry rearer who goes in for this part of the industry should make it a part of his business to enhance the standard of table poultry in his particular district, to educate his customers into a fuller appreciation of really good fowls, to show them that it is more economical to pay a little more for a well-fed bird than a small price for a lean one. He ought also to widen the scope of his business not only by having chickens ready for every week of the year, but by introducing novelties and by affording his customers a variety of poultry. The public only want good things introduced to them and ready buyers will be forthcoming.

CHAPTER XIV

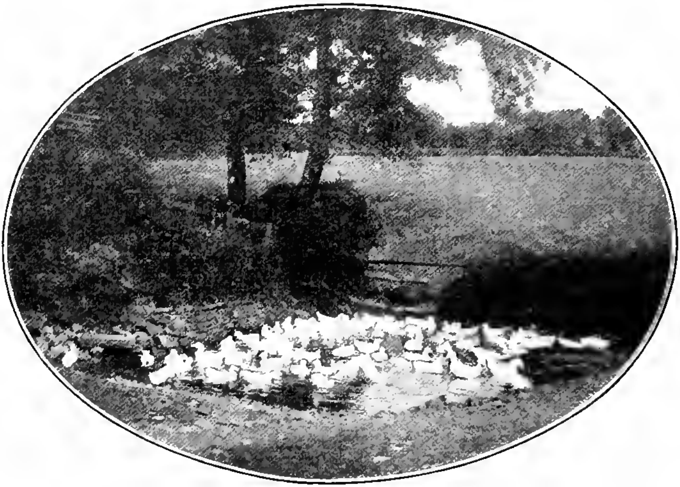
DUCKS

General Management

ALTHOUGH, for various reasons, ducks are not as popular as ordinary fowls, there are many occasions when they could be made equally as profitable—if not more so. The complaint made by many people against ducks is that they are dirty and gluttonous, but they are neither the one nor the other if properly managed. No live stock delights in cleanliness more than does the duck, which is never so happy as when washing, and as for gluttony, it is the very thing we want when rearing for table! I have kept all the known breeds of ducks, save ornamentals, and found that, while the stock bird's food could be easily regulated, the more the market ducklings ate the more profitable they were, because they were ready to kill sooner.

LIBERTY DESIRABLE.—When ducks are kept as breeders, or as layers, they not only require liberty, but swimming water. There are few things these birds enjoy more than roaming the fields at dusk—the natural feeding-time of their species when in a wild state—and if the land is swampy, so much the better. On such a place they find an enormous quantity of vegetable and animal food, and the latter all laying ducks require in a larger proportion than hens. Small frogs and eels, snails, slugs, worms, and minute creatures which live at the bottoms of ponds and streams, all form a part of the duck's food, and the latter never do so well when they have not the facilities for obtaining such diet, as well as the exercise which the necessary foraging entails.

FEEDING STOCK DUCKS.—The same food may be given to the stock ducks as that recommended for hens, but more bran is desirable, and, as I have stated above, more meat—especially when the stock cannot get any for themselves, such as during dry or frosty weather.



A Morning Dip

Pekin Ducks at Woodside Cottage Farm, Whaley-Bridge

Mix the food crumbly (not sticky nor too wet), and never allow the birds to gorge themselves, or they will get lazy, fat, and unprofitable. The best grain to use is oats, but a little cracked flat maize is useful in hard weather. Two meals a day are ample. Indeed, it is often desirable to give one only, and that of grain, when the stock is at liberty and the season favourable for the production of natural life.

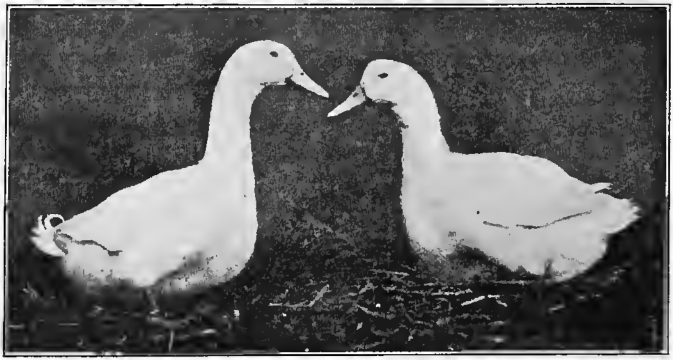
HOUSING.—The birds should always be shut up at night, the house being provided with a dry floor, well littered with hay or straw (which, if shaken up with a hay fork every day or so, will keep sweet for a long time), and an open front. When ducks are in lay, each house should have a small wire run attached to it, in which the birds can be given their first meal and a pan of water. If this

Pekin Drake

The property of Mr. C. D. Milne, Whaley Bridge. Winner of 1st Dairy, Crystal Palace, Leeds, and many other prizes is not done, the possibilities are that the eggs will be laid away—perhaps in the pond—but if the birds are kept in the enclosure till 10.30 a.m. there will be no fear of such loss, for ducks seldom lay after that hour.

MATING.—The larger breeds—Aylesburies, Pekins, or Rouens—must not be too heavily mated, one drake to three or four ducks being ample; but an Indian Runner drake can be allowed five or six on an open range.

HATCHING AND BROODING.—Duck eggs can be hatched either artificially or under hens, many practical rearers preferring to adopt both methods in conjunction, by hatching in an incubator and then transferring the youngsters to broody hens. The latter may be given a large number, forty to fifty often being committed to the care of one hen in warm weather, for, unlike chickens, these birds require very little brooding. An over-heated foster-mother is more fatal to them than to chickens. All they require for the first three or four weeks is a very moderate heat, or simply a weather-proof coop, with a thoroughly dry and warm bottom, and a good-sized,

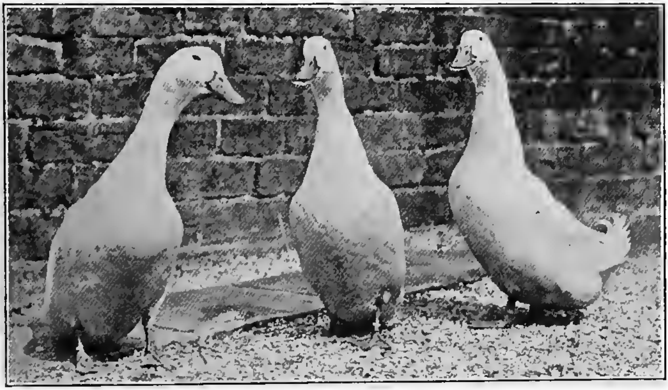


[*By the courtesy of "The Reliable Poultry Journal"*

AYLESBURY DRAKE AND DUCK

amiable hen. In hatching artificially, the same rules may be applied to duck eggs as already recommended for those of hens. The period of incubation is twenty-six to twenty-eight days, and the actual hatching is, as a rule, more successful than it is with other eggs.

REARING DUCKLINGS.—Whatever means of rearing are to be adopted, the ducklings do not require any food for the first thirty-six hours, after which they may be fed almost exactly as though they were chickens (see Chapter VI), the only difference being that they require finely-chopped green-stuff, or onion, from the very beginning, and the ordinary chicken " dry feed " is not suitable for them. But some groats may be given (sprinkled on the water), and, later on, those birds not being fattened may have such grain as wheat, barley, and a little cracked maize daily, in addition to the mixtures, as soon as they are old enough to take it. The water should be placed in a shallow dish, and some fine river gravel (not sea sand) placed at the bottom of this will serve for grit. It is often wise to place some flat stones in the water dish



A Trio of Mr. C. D. Milne's Pekins

for the birds to stand on, otherwise they may get in, and, failing to get out, very quickly drown. For the first few days a rather restricted range is desirable, but as soon as they show an inclination to wander they should be allowed to do so, for it promotes health and growth. Vermin must be guarded against—especially rats, which have a distinct partiality for ducklings—and, notwithstanding popular beliefs to the contrary, wet weather is very disastrous to these birds until they are about five or six weeks old. A drenching from a sudden, heavy shower is often sufficient to kill off a whole flock of youngsters, which get chilled very easily, acute cramp being the final cause of death. The necessity for shelter will, therefore, be obvious to all beginners, and, as in the case of older stock, ample space and airiness are essential in the sleeping-places throughout the rearing process.

DUCKLINGS FOR MARKET.—Although the ducklings destined for stock purposes may be brought up in the same manner as the chickens, those which are to go direct to market as soon as they are ready require rather different treatment. When they are about seven weeks old they should have their liberty somewhat curtailed, and swimming (if it has been permitted) must be no longer allowed. The feeding should be made more fattening—the mixtures recommended for fattening chickens being used—and, instead of water, milk or buttermilk may be given to drink. By the time the birds are about nine weeks old they should be entirely confined to a shed, with a small run attached; and during the remainder of the period they may be finished off by allowing some animal fat daily and such foods as cheap rice boiled, either with milk or meat liquor, and mixed with middlings; or boiled potato, ground oats, animal fat, and buttermilk. Scraps from the household also come in useful if boiled, minced and stirred crumbly with ground oats and middlings.

These birds need no green-stuff, but a heap of gritty substance, such as cinders, must be placed in the run. Quietness, regular hours of feeding, and comfort are very essential to successful fattening, and the feeder must watch the birds' appetites very carefully lest they go off their feed. It is easy to so sicken ducklings penned up to fatten that they ultimately decline to eat at all. But the practised feeder will see that such a calamity does not happen, and he will coax the appetite by giving a variety of mixtures, taking care that the latter are of a kind likely to conduce to good fattening.

Stock Ducklings on Mr. C. D. Milne's Farm, Whaley Bridge

AGE FOR MARKETING.—There is a certain stage at which ducklings arrive when, if they are destined for table, they must be at once sold off, for after that they immediately begin to deteriorate. This is when they are anything up to three months old—successful fatteners often have ducklings ready for market at the age of eight or nine weeks—but the precise stage is just when the primary wing feathers are about half grown, and before those of the body (*i. e.* the adult plumage) begin to appear. Many an unpractised hand has suffered loss and disappointment owing to his not getting rid of the birds at the right time, and this is a point which all beginners should make a note of. Cockerels deteriorate as soon as they arrive at the crowing stage, but the abrupt transformation for the worse in ducklings at the period I have specified is even a more serious matter.

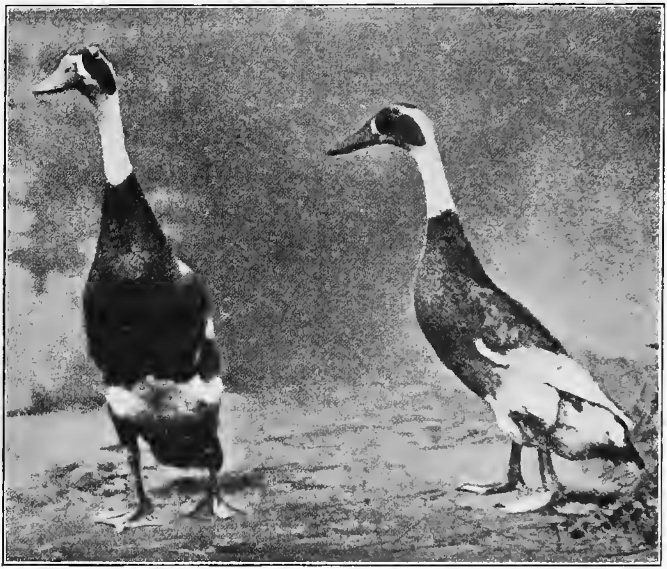
PREPARING FOR MARKET.—Ducklings should be thoroughly well fasted if they are to be marketed, and dislocation of the neck is the best method of killing. The preparation of these birds for market is simpler than in the case of fowls, and in plucking, the skin—except that of very young birds—is less liable to tear. Before the carcases have become cold and set, plucking and singeing having been completed, they should be laid breast downwards on a table or slab, the wings and legs being twisted round so as to rest on the back, and pressed with a weighted plank. This will bring the flesh up to the keel, giving the breast a broader and flatter appearance, which will be retained, provided the birds are allowed to become thoroughly cold before removing from the press, until ready to carve. Trussing is an easy matter with ducklings, and can be picked up in one or two lessons, and the only advice I need give the novice here, is that of keeping the carcases clean. The legs and feet, which are always left on, must be washed and wiped dry, and the flesh handled as gently as possible; a mauled, flabby specimen never looks nice, and appearance goes a long way with all classes of customers.

DUCK-FARMING PROSPECTS.—The prospects which are offered by duck-rearing for market are most encouraging. People with a limited amount of land can go in for this industry by dispensing with stock birds, which desire a good range, and buying the eggs for hatching, or the ducklings themselves at an early age. Small pens erected in a garden, and periodically cropped when vacant with vegetables, will accommodate a number of market ducklings in the course of a season, for, being almost immune from disease—save those ailments arising from dampness—they can be run thicker on the ground than chickens. Ducklings, when quite small, do a vast amount of good in the vegetable garden, by devouring insect pests, slugs, etc., and they will not interfere with growing crops, except tender green-stuff. The fattening of ducklings, as a sole pursuit, pays very well in many parts of the country, and there are duck farms in existence to-day which have been flourishing concerns for many years. The best prices for ducklings, taking the country generally, are obtained in the spring, but there is a ready demand in most places all the year round, for good birds.

BREEDS OF DUCKS.—The finest breed of duck for table purposes is the Aylesbury, which is not only large, meaty, and a fast grower, but it has a white plumage, which is a distinct advantage. Pekins are a close second, being much like the preceding, the main difference being the pale yellow plumage and deep orange bill, the latter, in the Aylesbury, being pinky white. The Pekin, being a much better layer, is generally crossed with the Aylesbury, the progeny—Aylesbury-Pekin—being all that can be desired in a first-rate table duck.

A PROLIFIC BREED.—Among the breeds which are most noted for laying only is the Indian Runner, an active fawn-and-white breed of most remarkable prolificacy. A flock of these birds at liberty in the fields, being kept in all respects just as though they were colony layers, will hold their own with most hens as egg-producers, and the eggs have none of the strong flavour of larger breeds, being, in fact, peculiarly light and delicate, yet of large size.

Runners must, however, have an ample range, and I know of no breed, or species of poultry, that will pay a farmer so well—if kept as layers—as this one. They produce eggs practically all the year round if given a fair chance, they are untiring as foragers, extremely hardy and vigorous, and do not require swimming water. They are, moreover, a peculiarly graceful duck, having none of the waddle of heavier breeds. They are rather too small as



[*By the courtesy of "The Reliable Poultry Journal," U.S.A.*

INDIAN RUNNER DRAKE AND DUCK

market ducks, but for flavour, delicacy, and quantity of meat in proportion to size, they are unequalled. For the home table, therefore, or for those customers who know their peculiar merits, they are excellent. For producing very early ducklings, which need not be large, Runner ducks may be crossed with a Pekin drake, the result being a very marketable bird of rapid growth.

Ducks, unlike ordinary fowls, can be kept as breeders, or layers, for three or four years, and often longer. In fact, I always think that they are not at their best until three years old, and many Runners, in my own experience, have laid most remarkably until their sixth season.

CHAPTER XV

BREEDS OF POULTRY

IN giving a brief description of our better-known breeds of poultry my object is merely to afford the novice some guidance in the choice of his stock from a utility standpoint.

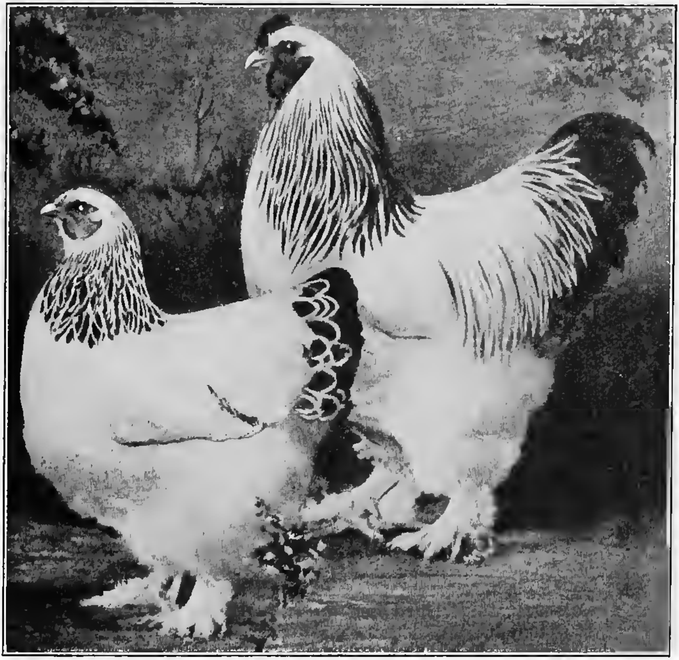
But the reader must bear in mind what I have already said regarding the difference between strain and breed, and the importance of the former, more especially in egg-production.

ANCONAS.—Two varieties, viz. rose- and single-combed, both being black mottled with white. Light and active. Great foragers, hardy and first-rate layers. Most suitable for an open range. Non-sitters. Eggs good size, and pure white. Not a suitable breed for table.

ANDALUSIANS.—Much like the Ancona in general characteristics. Prolific layers and non-sitters, most adapted for a free range. Like the preceding, this breed is a rapid grower, pullets sometimes commencing to lay at five months old. Colour, a slaty blue laced with lustrous black.

ASEEL.—A fancy breed allied to the Indian Game, but smaller than the latter and not recommended for utility purposes.

BRAHMA.—A very large, heavy breed in two varieties, the dark and the light. The Brahma is now almost entirely confined to the fancy section of poultry breeders, but it is not so popular as it once was. The breed, however, is a valuable one for crossing purposes—more particularly when high-class table fowl are required. It has been largely used in the formation of more modern breeds such as Wyandottes and Faverolles. To the utilitarian, the good qualities of the Brahma are most useful when contained in these latter breeds. It is, in its pure state, not a fowl for any one to take up for utility work.



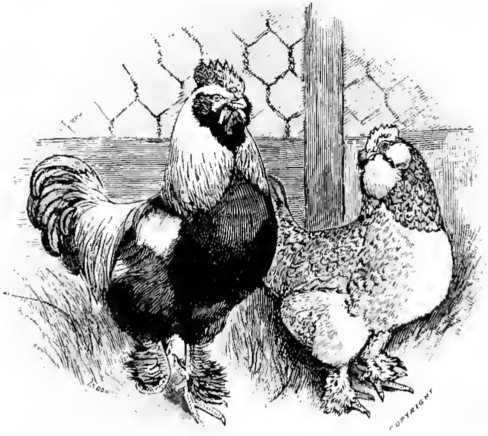
[*By the courtesy of* "*The Reliable Poultry Journal*"

Light Brahmas

Owned and bred by Mr. C. P. Nettleton, Shelton, U.S.A.

COCHIN.—Another large Asiatic breed which, like the foregoing, is of little use except to the fancier. But to the Cochin also we are indebted for many of the good qualities of our Orpingtons and Wyandottes—the former having been largely used in producing more modern and useful breeds.

CRÈVE-CŒUR.—One of the oldest and most useful of French breeds, and one that deserves to be better known in this country. Though some strains are a trifle delicate, the breed, on the whole, can be recommended as an excellent layer and a first-rate table fowl. The cockerels are also very useful for crossing with almost any breed, and will improve farmyard stock very materially. This fowl is crested, like the Houdan, and there is one main variety which is glossy black throughout.



A Pair of Mr. C. H. Bradley's Faverolles

DORKING.—Several varieties, the silver-grey and the dark being most commonly seen. Already referred to as the table fowl *par excellence*—a reputation it has held since the time of the Romans. Some strains are not hardy enough for exposed runs, or cold, damp situations, but the chickens generally grow fast and attain a great size. For general market work many breeders prefer to cross Dorking hens either with an Indian Game or Houdan cock. Unfortunately, the Dorking is a poor layer, so that when eggs are desired for hatching very early chickens it is sometimes disappointing.

FAVEROLLES.—The most popular variety being the salmon, a most useful all-around breed, containing, as it does, the good qualities of Houdan, Brahma and Dorking in combination. Recommended for general utility purposes; will do well almost anywhere. The eggs are tinted, and the chickens very robust and hardy, growing quickly and attaining a marketable size at an early age. Quality of flesh is excellent.

GAME.—These fowls are practically confined to the Fancy, though the old English—now, happily, becoming very popular—has sterling merits as a table fowl, the flesh being of fine texture and flavour, while the depth of breast-meat is unequalled by that of any other breed. Game are extremely hardy, and the hens make good sitters and mothers. An open range is desirable. In using Game blood for producing table chickens select a very large white-legged Old English cock, and mate him to any big-bodied hens such as Dorkings, Orpingtons or Faverolles. No varieties of Game are good layers; they should, therefore, not be used as sires by poultry keepers who desire all-round fowls.

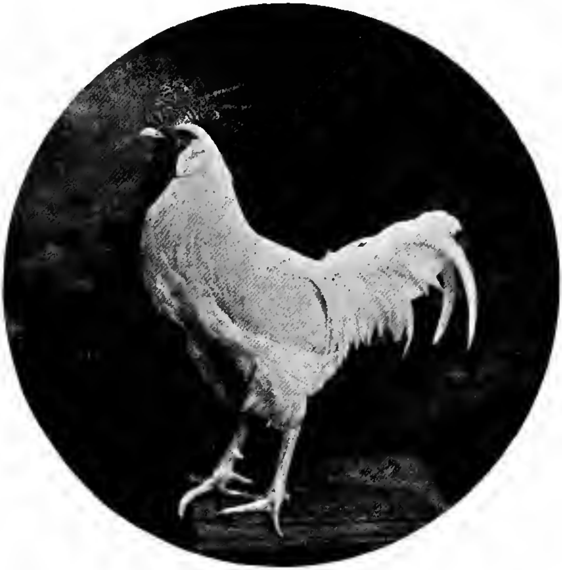
HAMBURGHS.—A light, active breed consisting of several varieties, of which the black, gold and silver spangled, gold and silver pencilled, are the best known, Hamburghs are now almost exclusively in the hands of fanciers, though some strains still maintain their old reputations as prolific layers, small eaters, and active foragers.

HOUDANS (See Frontispiece).—A very valuable French breed and the most popular of its kind in this country. The colour is black, mottled with white, and other distinguishing features are the fifth toe (like the Dorking), the long deep body, crest and "muffling." Houdans are excellent layers and table fowls, but the best way to use the breed is for crossing purposes. Any kind of fowl, Asiatic, Mediterranean or mongrel, is improved by an infusion of Houdan blood for general use. The utility poultry keeper, no matter how great a novice he may be, can scarcely make a mistake in using a Houdan sire. Further references to this splendid breed will be found in earlier chapters, but it may be added here that whenever Houdan blood is used for crossing it will predominate in the offspring.

INDIAN GAME.—A fowl related to the Malays and Aseels and now generally used for exhibition purposes or breeding table birds. It is very heavy, the quality of the flesh being of the best, but an indifferent layer. References as to the value of this breed have already been made, but it may be desirable to state here that the utilitarian should use the Indian Game as a sire, and only for the purpose of producing table fowls. It will improve any breed or cross from that point of view, but is out of place when eggs are wanted. The shanks and skin are yellow, but, as before pointed out, that should not be considered a blemish in any table fowl. Indian Game are not fast growers, but the chickens plump at an early age and without much fattening. The breed is a very hardy one and prefers a wide range.

LA FLÈCHE.—An old French breed once held in great repute as one that was generally useful. Many strains are, however, now very delicate and, notwithstanding its excellent properties, the bird cannot equal many more modern creations.

LANGSHANS.—This is a breed now seen in two varieties, viz. the "croad" or the old type, and the "modern." The former is not unlike a black Orpington in general outline and character, and is a better fowl for the utilitarian than the "modern," which is smaller in the body and too long in the legs. "Croad" Langshans are generally good layers of eggs that are of an exceptionally rich brown, and the young birds, in spite of the black plumage and shanks, have a remarkably white skin and flesh of good quality. This breed is hardy, thriving almost anywhere, but for general use I prefer it as a cross, *i.e.* blended with Houdan or Crève-Cœur. Langshan hens, crossed by an Ancona or Minorca cock, also produce a first-rate layer for runs of any description.



WHITE LEGHORN COCKEREL

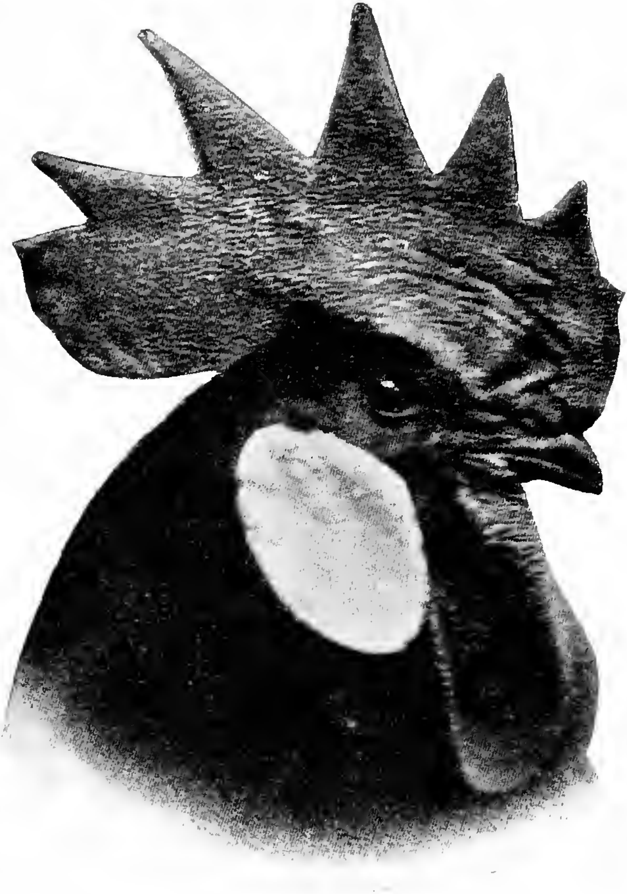
1st Prize Crystal Palace, 1907, and winner of many other prize trophies.
The property of Messrs. Whitaker and Tootill

LEGHORNS.—One of our most useful breeds from an egg-producer's point of view: the "business hen" of America. There are many varieties, the whites, blacks and browns being the most commonly seen, but several of the newer kinds are becoming most popular as fancy fowls. Leghorns are essentially layers and much like Anconas in character. They delight in an open range, are splendid foragers, non-sitters, and hardy enough for most situations. The eggs are pure white and of good size. As table fowls Leghorns cannot be recommended, but a Houdan-Leghorn cross is a fowl of rare quality for general use. Such a wide difference exists between the laying properties of exhibition and utility strains of Leghorns that the beginner may be warned to be careful in buying new stock.

MALAY.—A breed which is very similar to the Indian Game, and at one time used for imparting good table properties — particularly breast-meat — to fowls more deficient in those attributes. But owing to the great length of limb, weight of bone and pugnacious disposition, the Indian has quite superseded it as a utility fowl, and the Malay cannot be recommended as such.

MINORCA.—One of the oldest and best of the non-sitting breeds, being the largest of all the Mediterraneans and a first-rate layer. The eggs are of a pure chalky whiteness and, on an average, are bigger than those of any other breed. They frequently weigh six to the pound. Some strains of Minorcas have deteriorated in economic properties owing to excessive breeding for head points, and the utilitarian will do wisely to choose birds with moderate, rather than abnormal, combs. This breed excels as one adapted to confined runs, for not only does the black plumage not show the dirt, but the birds do not fret for liberty, nor do they become over-fat so quickly as many other breeds do in close quarters.

If marketed when young enough Minorca cockerels make fair table birds, but for this and general purposes

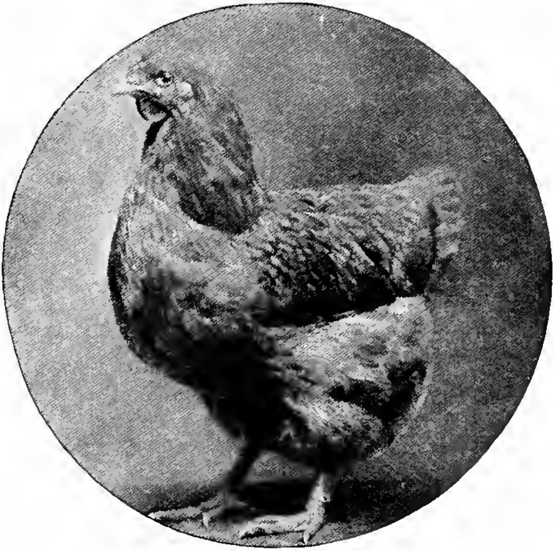


Head of Minorca Cock

Bred at Quarry Farm, Pool, Leeds, by Messrs. Whitaker and Tootill

Minorcas are better when one-half Houdan blood. In fact, I do not know a better all-round fowl than the Houdan-Minorca, granted that it is well bred from healthy parents.

ORPINGTONS.—This breed is now composed of several varieties, the better known being the buff, black and white. Average specimens of all three are very much on an equal as regards utility properties, though the black is perhaps at a little disadvantage as a table fowl on account of its dark shanks, the latter in the other varieties being white. The buffs are, at present, the most popular and probably the most widely kept of any fowl on account of their excellent economic qualities. All varieties, however, are generally useful, being very good average layers



[*By the courtesy of " The Illustrated Poultry Record"*

Black Orpington Pullet

of tinted eggs, careful sitters and mothers, and useful as table birds. For the last purpose they are a trifle slow in growing and the cockerels are liable to get leggy, being large in bone and slow to feather, but the flesh is of fine quality. Orpington hens make a good basis for crossing purposes with Indian Game, Houdan or Mediterranean sires, and the breed is extremely hardy, thriving on most situations. As fancy or exhibition stock Orpingtons are as popular as they are with utilitarians, the self-colours of the leading varieties requiring less skill in breeding than many other breeds demand, though it is by no means an easy matter to produce high-class buffs. One or other of the varieties of this useful breed should be afforded a place on most poultry farms.

POLISH.—These fowls, which are seen in many varieties, are best adapted for exhibition purposes. They are somewhat delicate for utility work, and though good layers and carrying a quality of flesh much like that of the Houdan, they are not equal to the latter, to which they are allied, for general use.

PLYMOUTH ROCKS.—This famous breed, which is so universally kept, both for show and utility, is a deserved favourite, for it possesses sterling qualities of which its extreme hardiness is perhaps the most prominent. There are several varieties, but the barred is the oldest and most popular. The Rock is much esteemed in America—the country from whence it came to us—for its all-round usefulness. It is a good layer under almost any conditions, a very fair table fowl which comes to maturity at an early age, and one that is well adapted for crossing. Like the Orpington it is improved by a blend with some non-sitting variety for general purposes. In close confinement Plymouth Rocks, not being of an active disposition, are apt to get over-fat if not carefully fed, and as foragers in the open they are rendered more useful by an infusion of lighter blood. The hens are good sitters and mothers, and the eggs are a nice brown tint. The barred Rock is cuckoo-coloured, *i. e.* each feather has a ground-colour of greyish white evenly barred with bluish black.

[By the courtesy of "The Illustrated Poultry Record"

WHITE ORPINGTON PULLET

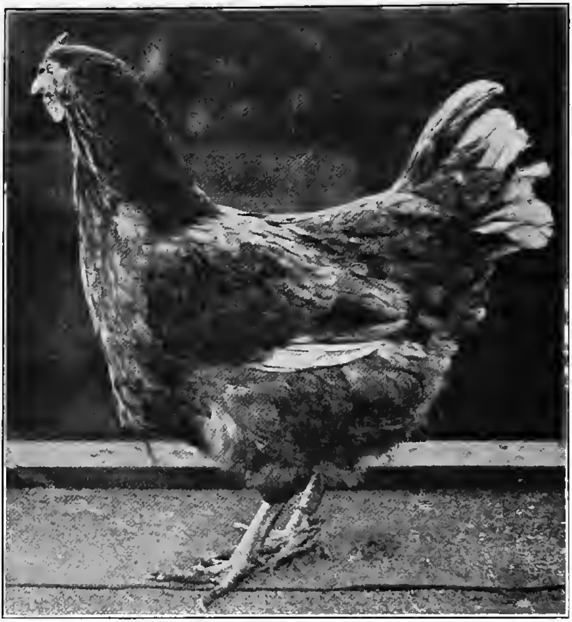
The more distinct the markings the better. The shanks are a deep yellow, the skin being of the same tint.

REDCAPS.—One of our oldest breeds and formerly classed among the Hamburghs. They have always been most popular in the north, more especially in Derbyshire and Yorkshire. The colour is a reddish brown spangled with black crescentic markings, save in the hackles of the cock, which are striped. The most distinguishing feature is the very large rose-comb, which has given the breed its name. Redcaps are prolific layers, very hardy and active, and fair table fowls. But it is as egg-producers that they excel, and a remarkable peculiarity is their prolificacy late in life, or when the average layer is considered to have passed her best. This is a breed that deserves more attention than is now bestowed upon it.

SCOTCH DUMPIES.—A breed of great antiquity in Scotland and seen in various colours. Although specimens of Dumpies often weigh six to eight pounds they have remarkably short legs and feet, the shanks often being not more than one and a half inches long. They are excellent table fowls, being much like the Dorking in this respect, and very good, hardy layers. The hens make first-rate sitters and mothers, being able to cover a large number of eggs and, having a docile disposition, they are particularly useful as "broodies." It is a pity this breed is not taken up more largely by utilitarians.

SCOTCH GREYS.—This, as its name implies, is another breed hailing from north of the Border, where it has been valued for its economic properties for many years. Scotch Greys are much like barred Rocks in colour, but the shanks and skin are white, and the build of the bird lighter and more lively than that of the Rock. It is an active forager, exceptionally hardy, has a carcase of really good quality, as a table fowl, and is a very fair layer. The Scotch Grey is a breed to be recommended for general use, more especially in exposed situations.

SILKIES.—A small breed having a white plumage of downy fineness and a skin of a bluish purple tint. The Silkie is now mainly used for show purposes, but the hens are light and wonderfully steady sitters. They are often in great demand for incubating the eggs of bantams, pheasants and partridges.



A Blue Wyandotte Hen

The property of the Rev. Lewis Jones, Heyope, Knighton

SPANISH.—These black fowls, with their conspicuous white faces and large red combs, were once the most prized of all layers in this country. In general character they were much like what the Minorcas—to which they are closely allied—are to-day. At the present time, however, they are practically of no value to the poultry farmer.

WYANDOTTES.—Next to the Orpingtons these fowls are perhaps the most widely kept. The oldest varieties are the gold and silver laced, but these have been largely superseded by the partridge, white and black. There are also numerous other varieties. As the Wyandotte, like the Rock, originated in America, it would be almost superfluous to say that it is economically useful. It is a first-rate all-round bird, being a good layer of tinted eggs, very hardy, and a tolerably good table fowl. The hens are capital sitters and mothers—perhaps the best of the larger breeds—but the broody instinct is not troublesome in flocks that have been bred to lay. All the varieties have intrinsic merits much in common, but the whites, of late years, have been exceptionally popular as layers. This is probably because they have been given more attention by laying-strain promoters and not because they have any peculiar merits of their own. Wyandottes cross well with the Houdan for general use or with Indian Game for table. In its unending varieties, many of great beauty, the Wyandotte is not less in favour as a fancy fowl than it is as a valued utility breed.

YOKOHAMA.—Perhaps the most strikingly beautiful of all breeds. The plumage, which is of great variety in colour, is very abundant and long, the tails of the cocks often attaining to several feet in length. Although this breed has good utility properties it cannot be recommended save as a fancy fowl.

NOTE.—Readers who are anxious to keep their breeds up to type from a fancier's point of view, or who are in doubt as to what a good specimen of one kind or another should be like, can obtain the Show Standard of Excellence for all recognized breeds from the Hon. Sec. of the Poultry Club (Mr. G. T. Drake, Cobtree, Sandling, Maidstone), or from one of the many clubs which cater for the welfare of individual breeds, and who are generally willing to give full information as to the latter to any inquirer.

CHAPTER XVI

DISEASES OF POULTRY

A FOWL HOSPITAL.—Few people who have not had practical experience with poultry are aware of the fact that fowls are just as susceptible to disease as human beings, that practically all the maladies which attack us are common to the poultry-yard. But, if taken in time, there are not many diseases which an intelligent poultry keeper cannot cure with care and patience. In the following pages I have arranged, alphabetically, all the more common ailments with their symptoms, causes and treatment. But let me impress upon the novice the necessity not only for the isolation of sick birds, but for the removal of the causes which brought about the disease. No permanent cure can be hoped for unless these matters are seen to. Lack of fresh air in the sleeping quarters, unclean surroundings, impure water, insect vermin, draughts, and dampness underfoot must all be remedied, or the best of treatment will be bestowed upon the patient in vain. Whenever a large number of fowls are kept it is desirable to set apart a small shed as a hospital for patients. This should be dry and fairly warm, facing south, and protected from draughts, though ample fresh air is essential. The ground must be well covered with peat moss, or short hay, and a few show-cages are useful for individual birds. It is also well to be prepared for sickness by laying in a small stock of simple remedies of which the following are likely to be of most use: Epsom salts; a few ounces of permanganate of potash; some block camphor; salad oil; vaseline and turpentine; a small bottle each of terebene, tincture of aconite, carbolic acid, tincture of iodine, spirits of camphor; a chemist's ordinary tonic mixture (iron and phosphate of lime), some flowers of sulphur and a good disinfectant, such as Jeyes' Fluid. In administering medicines to poultry it may be borne in mind that, generally speaking, the amount to give each full-grown bird is one-third an ordinary human (adult) dose.

ANÆMIA.—*Symptoms:* Paleness of face, lustreless plumage, emaciation, depression. *Causes:* Lack of green food, fresh air, sunshine and exercise; overcrowding, especially in small dark runs. *Treatment:* Supply those necessities to life and health of which the birds have been deprived, see to insect vermin, feed nourishingly and give a little iron tonic, such as Parrish's Chemical Food, in the water.

APOPLEXY.—*Symptoms:* The bird reels about as though dazed, sometimes falling to the ground. *Causes:* This condition is generally due to pressure of blood on the brain, owing to the rupture of a small blood-vessel. Fowls that have been too highly fed are most liable to be affected. *Treatment:* Place the bird in a dark, quiet pen and give as much Epsom salts as will lie on a sixpence, with a very little warm water. Give no food for twenty-four hours and repeat the dose, after which a light meal, such as bread, oatmeal and water, may be allowed.

BRONCHITIS.—*Symptoms:* A dry cough, or "rattle" in the throat; difficulty in breathing, sometimes running at the nostrils. *Causes:* Dampness, sudden changes in temperature, draughts in roosting-place. *Treatment:* Warmth is very necessary. Give three drops of spirits of camphor in a teaspoonful of glycerine twice daily. In serious cases the bird's head may be held in the steam of boiling water (taking care not to scald) in which a little terebene has been mixed. Feed on soft, warm foods slightly seasoned with pepper, ginger, or a roup powder.

BUMBLE-FOOT.—*Symptoms:* Lameness caused by an enlargement of the ball of the foot, which has a hard, corn-like growth at the centre. *Causes:* Perches too high, confinement on rough, stony ground. Some breeds, especially the heavier ones and those with five toes, are more disposed to this disease than others. *Treatment:* Keep the fowl on soft hay, pare the hard central part, or swelling, and immerse the whole foot in warm water, keeping it there for ten minutes. Dry after each immersion and apply tincture of iodine to swollen part. This should be done twice daily. When the swelling is reduced a few drops of acetic acid may be placed upon the central corn every evening at roosting time.

COMB DISEASES.—See "Favus" and "White-Comb."

CATARRH OR COLD.—*Symptoms:* Running at the eyes and nostrils. Swollen face, sneezing, shivering, and heavy breathing. *Causes:* Contagion from affected birds; sudden changes of temperature; dampness; insufficient shelter; overcrowding, and foul air at nights. *Treatment:* Keep the patients warm, and give each two drops of spirits of camphor in a little glycerine twice daily. Sponge eyes and nostrils frequently with a weak and warm solution of permanganate of potash, dry thoroughly after each operation and place a few crystals of the above potash in all drinking water. Feed on warm nourishing food seasoned with a good roup powder or cayenne. This disease may develop into roup (*q. v.*) if not taken in hand and treated promptly.

CHOLERA.—Perhaps the most fatal of all diseases. *Symptoms:* Intense thirst, shivering and ruffled plumage. Evacuations loose and of a greenish or white colour. Skin and comb are dark, almost purple. Death usually takes place within thirty-six hours, the sufferer being either in stupor or convulsions. The skin of the abdomen very soon turns green after death. *Causes:* Defective water supply, filthy surroundings. Decomposing animal or vegetable matter. Exposure to dampness for prolonged periods. Manure-heaps and stagnant water within access to the fowls. Contagion. *Treatment:* This disease is so rapid in its course and so terrible in its effects that there is generally no time for treatment. It is wiser to kill off all affected birds whenever the first symptoms appear, for so long as birds suffering from cholera are alive, they are distributing countless millions of the germs of the disease upon the ground, by means of the droppings, which may be picked up by healthy stock with food or herbage. Small particles of the evacuations carried on the attendant's boots from pen to pen may contaminate a whole farm in a few hours. Unaffected stock should be removed to fresh ground, and all pens that have contained diseased birds must be well limed and vacated for at least twelve months. Dead birds must be burned or buried deeply in quicklime.

CONSUMPTION.—See "Tuberculosis."

CRAMP.—This is not a disease in itself but the result of some other ailment such as Gout, Rheumatism or Leg-weakness (*q. v.*)

CROP-BOUND.—*Symptoms:* Crop very full and hard. Breath foul. The bird wanders about by itself as though looking for something. *Causes:* In most cases of crop-binding the bird has swallowed long blades of tough grass which get into a ball and so render their passage to the gizzard impossible. Careless feeding also frequently results in crop-binding. *Treatment:* Give a couple of teaspoonfuls of salad oil, and then fill the crop with as much warm water as it will hold. Now knead the crop, gently at first, until it is perfectly soft and the contents broken up. Then suspend the bird by the legs and, holding her neck straight with one hand, work the food in the crop downwards with the other. In most cases the crop can be entirely emptied in this way. After the operation administer a tablespoonful of warm water containing a good pinch of Epsom salts and put the bird in a basket until next day. Soft food only should be given for three or four days after crop-binding. When a fowl's crop cannot be emptied in the way recommended it is usual to make an incision and remove the contents with a small spoon, but, although the operation is a simple one, the novice should secure the services of an expert to carry it out, and I do not consider it is worth the time and trouble unless the fowl is a valuable one.

DIARRHŒA.—*Symptoms:* Looseness of the bowels. *Causes:* Sudden changes of weather, especially to a lower temperature; wrong feeding, sour food. *Treatment:* Provide a warm, dry shelter and give a change of food, such as rice boiled with milk, or oatmeal and milk seasoned with a little ginger. Two or three drops of camphor on a meal pill are useful in stubborn cases. Add a few drops of chlorodyne to all drinking water. Diarrhœa is more serious with young chickens and is often brought on by over-heating in brooders as well as by exposure to dampness. The only treatment that can be given to them is as follows: Keep the brooder scrupulously clean; feed largely on boiled rice, rinsed with cold water, and mixed with a little fine oatmeal; place a lump of camphor in the drinking water; find out the cause of the outbreak and remove it.

DIPHTHERIA.—A very dangerous and highly contagious disease sometimes called "canker" or diphtheritic roup, and not infrequently developing from ordinary roup (*q.v.*). Caused by a bacillus and usually most prevalent when there is insanitation, lack of fresh air, green food and sunshine. *Symptoms:* Yellowish growths in the throat or roof of mouth, sometimes seen outside about the eyes or base of beak. There is usually a discharge from the nostrils, the breath is foul and the bird depressed and ruffled in plumage. *Treatment:* It is wisest to kill off all affected birds at once, burying them deeply, for not only is the disease a tedious one to cure but it is by no means unlikely that it cannot be transmitted to man. It is highly contagious, spreading rapidly through a whole yard if not checked, so that the first loss is often the cheapest.

DROPSY. — *Symptoms:* Accumulations of watery matter either in the crop or abdomen, causing these parts to become distended or pendulous. Birds affected by this disease are usually old and in any case not worth the trouble of curing.

EGG-BOUND.—*Symptoms:* The bird visits the nest frequently, upon which she often squats in a position which indicates that she has difficulty in expelling the egg—usually an abnormally large one. In bad cases the wings droop and the bird is in evident pain. *Treatment:* Hold the vent in the steam arising from a jug of hot water, oil the part with a feather dipped in salad oil and then gently work the egg towards the orifice from the outside. It can easily be felt, but care must be exercised so as not to break it while in the oviduct. A hen will very often pass an egg without further aid after fomentation. Egg-binding is often due to excessive feeding, over-stimulation and insufficient exercise—hence its frequent occurrence in birds kept in small runs.

EGG-EATING.—This is rather a vice than a disease, though it may be classed as the latter, seeing that when it once breaks out it spreads like an epidemic. *Causes:* A vitiated appetite brought about by bad management, want of exercise and employment, lack of shell-making material, bad water supply and over-crowding. *Treatment:* Remove the offenders at once and give all a new run, plenty of green-stuff and diversion and a change of diet. Some sulphur in the soft food helps to bring about a more healthful state of affairs. When a whole flock is affected it is a good plan to surfeit the birds with eggs (any cheap ones will do) and egg-shells daily until they have become so sick of them that they are glad to turn their attentions to food of any other kind. Patent nests—made for this purpose—should be used to secure the eggs laid during the process of curing. But before any permanent cure of this vice can be hoped for, the causes which brought it about must be removed.

ENTERITIS.—A serious disease which, in an epidemic form, resembles cholera (*q.v.*) and, as in the latter disease, all birds suffering therefrom should be killed and buried deeply in lime. *Symptoms:* As in cholera, but the evacuations are more frequently yellow and often tinged with blood. *Causes:* A bacillus which is present in the blood, tissues and droppings of diseased birds. Cases of ordinary enteritis (inflammation of the bowels) are brought on by the fowls picking up poison, or quicklime, but even these are seldom curable, and no treatment is recommended. It should be incumbent upon every poultry keeper to do his utmost to stamp out both this disease and cholera by prompt and decisive measures. To attempt curative measures is only to court worse disaster.

FAVUS.—*Symptoms:* White or yellowish scabs on the face and comb. The skin of the neck is also sometimes affected. *Causes:* Insanitation, insufficient green food, light and air, contagion. This disease, being of a fungoid nature, is transmitted from one fowl to another by a microscopic mycelium which floats upon the air, and as it has been proved, beyond a doubt, that horses, cats and dogs, rabbits and even man may be affected it is wisest to kill diseased birds at once. Any attempt to cure is attended by much risk. The disease is a peculiarly loathsome one and is even less amenable to treatment when attacking other animals—including man—than it is when affecting poultry. (See "White-comb.")

FEATHER-EATING.—A habit most common to fowls kept in close confinement which, as the name implies, pluck and eat one another's feathers. *Causes:* Insufficient exercise and diversion; over-crowding; lack of green food; insect vermin and over-feeding. *Treatment:* Isolate the chief offenders and give all a fresh run, with more space. Remove the causes of the outbreak enumerated above and add a sprinkling of sulphur to the soft food every other day for a week.

GOING LIGHT.—See "Tuberculosis."

GAPES.—A disease almost entirely confined to chickens below the age of five weeks, though it affects many wild birds. *Symptoms:* There is at first a sneeze, with quickened breathing. The chicken then begins to gape, or gasp for breath. There is much distress, the wings droop and emaciation is rapid. *Causes:* A parasitic worm, or more usually several worms, in the trachea (wind-pipe) which irritate the membranes and eventually multiply to such an extent that the bird dies from suffocation. *Treatment:* Before speaking of curative measures I would impress upon all chicken rearers the desirability for employing preventatives whenever gapes are suspected. Like most other diseases this one is more easily prevented than cured, and when it is known that the gape worms are propagated in stagnant water and warm moist ground, and that land much used for rearing is likely to be more infected than new runs, we are half way towards a solution as to how the disease may be avoided. Pure drinking water—with a lump of camphor in it for preference—is the first essential. Feed onion with the food daily. Give a frequent change of run and avoid low, humid situations for rearing grounds. Keep the chickens robust by good management, and free from insect vermin. *Treatment:* Individual chickens may be treated for gapes as follows: Take a small feather, strip it of all but a small tuft at the end, dip it in eucalyptus oil and pass it down the windpipe (not the throat), the entrance to which will be found just at the back of the tongue. Do it carefully, and as soon as it has gone down about two inches twist it round between the finger and thumb and withdraw it. If the operation has been properly done, some bright red worms, or particles of them, will be seen adhering to the feather, but the process may have to be repeated several times before a cure is effected, though it is desirable to allow a day or two to elapse between each operation. Another method of curing and, perhaps an easier one, is as follows: Take a hot cinder and pour over it some carbolic acid. Then hold the chicken's head over it in the white fumes which arise, so that the latter will be inhaled, until the bird shows signs of fainting, when it must be immediately placed in fresh air. It is easy to poison a chicken outright if care is not taken over this operation. Larger numbers of birds may be treated all together on the same principle, the only difference being that they are placed in a box with a false bottom of some open material, underneath which the carbolic fumes are generated. The lid of the box should be of glass, and made so that it can be easily removed, and if the chickens are in a basket, within the box, they can be taken out more expeditiously at the precise moment. Any delay might mean the death of most of them. Chickens which die of gapes should always be burned and not merely thrown away to propagate the disease elsewhere.

GOUT.—*Symptoms:* Lameness or entire loss of use of legs. Feet often swollen but always heated. *Causes:*

Over-stimulation and too close confinement. Insufficient green food. Chickens kept indoors and fed largely on starchy foods are subject to gout. *Treatment:* Give some Epsom salts in the drinking water daily—using very little (scarcely enough to affect the taste) in the case of young chickens. Supply ample green-stuff and promote exercise. The acute symptoms may be relieved by frequent immersion of the legs in warm water, afterwards rubbing the parts with embrocation.

LEG-WEAKNESS.—This malady must not be mistaken for gout or rheumatism. It is almost entirely confined to half-grown cockerels of the heavy breeds. *Symptoms:* The bird gradually loses the use of its legs and often squats on his hocks when feeding. *Causes:* Too stimulating a diet; inbreeding; predisposition. *Treatment:* Whenever there is reason to suspect leg-weakness, dry bone meal should be used with the food from an early age. It is difficult to cure a cockerel when once it is "down" with this disease, and such birds are best killed, when they will be quite good for the table. In the earlier stages a course of salts of iron and phosphate of lime mixture in one-third adult human doses will be very beneficial. Rubbing with embrocation will alleviate cramp in leg-weakness, but it alone will never cure the latter.

PIP.—A "disease" which our ancestors appeared to believe was the only malady known to poultry. As a matter of fact there is no such disease as "pip," but that which passes for it in the eyes of ignorant people is nothing more than what we sometimes call a "foul tongue" in human beings. Slight doses of Epsom salts will usually remedy such a condition, but the mouth and nostrils may be swabbed at the same time with a permanganate of potash solution.

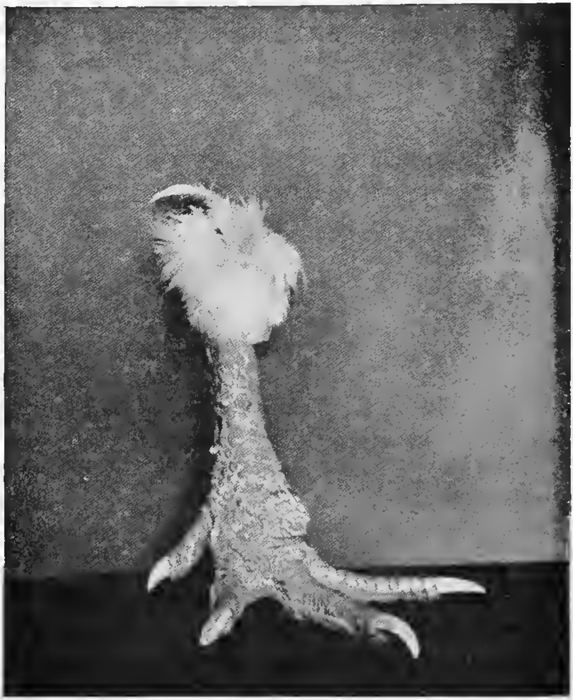
PNEUMONIA (*Inflammation of the Lungs*).—*Causes:* Exposure; sudden changes of temperature;

predisposition. In young chickens over-heating the sleeping-chambers is the most frequent cause of this disease, which to young birds is very fatal. *Symptoms:* Hurried breathing; cough; dejected appearance. If the ear is placed against the fowl's back between the shoulders a crackling sound, or "crepitation," can be easily heard. *Treatment:* Keep the bird warm and give a tablespoonful of linseed tea containing three or four drops of chlorodyne four times a day. Paint the skin on the back between the wings as far as the base of the neck, and the bare patch directly under each wing, with iodine twice daily. Feed on soft, wholesome foods slightly seasoned with roup powder. In outbreaks among the chickens, remove the cause, and mix a teaspoonful of glycerine and five drops of chlorodyne with each pint of drinking water. Feed well on nourishing foods, giving plenty of milk, and see that they are warm enough by day (though not tightly closed in) and not too warm at night.

RHEUMATISM.—Allied to Gout (*q. v.*), but there is usually no swelling and an absence of heat. Treat as advised for gout, giving, also, a pinch each of bi-carbonate of soda and chlorate of potash in the soft food to each adult patient.

ROUP (see "Diphtheria").—*Symptoms:* Same as described for catarrh, but the discharge is more offensive. The swellings about the face are also greater and emaciation more rapid. *Causes:* Draughts; foul air in the houses; over-crowding; dampness; insanitation. This disease is highly contagious. *Treatment:* Precisely the same as recommended for catarrh, but if bathing does not remove swellings they must be dressed twice daily with iodine, taking care this does not get into the bird's eyes. Keep the patient warm, feed nourishingly, and give a tonic, such as Parrish's Chemical Food, as soon as the symptoms begin to abate. Strict cleanliness is necessary throughout the process, and houses and runs after roup must be vacated and thoroughly cleaned and disinfected with lime-wash and carbolic acid or Jeyes' Fluid.

SCALY-LEG.—Perhaps the commonest of all diseases.



[*By the courtesy of " The Illustrated Poultry Record "*

SCALY-LEG

Symptoms: A thick, white incrustation upon the shanks and feet, causing the latter to look most unsightly. This disease frequently leads to permanent lameness. *Causes:* A parasitic mite which burrows under the scales of the legs and feet and there multiplies. *Treatment:* Scrub the parts with a good carbolic soap, warm water and nail brush and, after drying, apply carbolized vaseline. This must be done every alternate day for some time before a permanent cure is affected. Paraffin, if applied several times, will cure slight cases, and if the perches are also dressed with this oil it will prevent infection.

TUBERCULOSIS (*Liver Disease or Consumption*).—Many thousands of fowls die from this dreadful scourge annually. The symptoms are a gradual wasting away, the breast-bone becoming quite fleshless, though the bird's appetite may remain good and the comb a bright colour. When the disease attacks the liver there is often a yellowish tinge about the face and eyes. *Causes:* The tuberculous bacillus, allied to, if not identical with, that which attacks other animals, including man. *Treatment:* The disease is incurable and all affected birds should be killed and buried in quicklime, or burned. It is by no means certain that the tuberculous bacillus cannot be transmitted to human beings who eat the eggs laid by diseased fowls, which alone should be sufficient to impress poultry keepers with the necessity of stamping out the disease by the one and only known method, *i. e.* the total and immediate destruction of all affected birds.

WHITE-COMB.—*Symptoms:* A white powdery scurf upon the comb, wattles and face, often leading to the more serious "Favus" if not attended to promptly. *Causes:* Damp, unhealthy surroundings. Lack of green-stuff, air and sunlight. General insanitation. *Treatment:* Supply those deficiencies that have brought about the disease, give a tonic in the drinking water, and some fresh meat and ample green food daily. Dress the affected parts every day with carbolic oil.

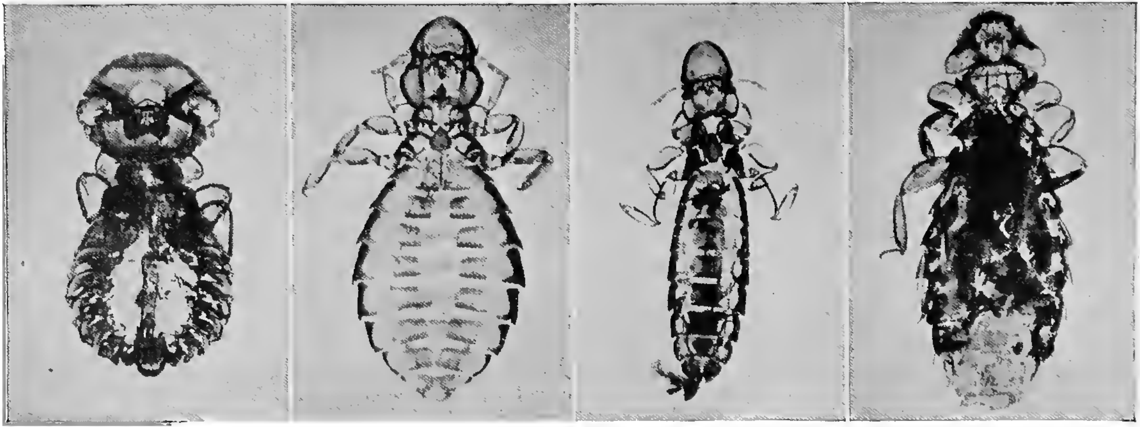
WORMS.—*Symptoms:* A ravenous appetite though the birds remain in poor condition. Ruffled plumage and general listlessness. Whole worms, or parts of the same, may be seen in the droppings of affected birds. *Causes:* Insanitation; impure food; feeding upon dirty ground and general mismanagement. *Treatment:* Fast the fowls and then administer a powder made up of one grain santonin and five grains areca nut in a dessert-spoonful of warm milk or water to each bird. All ejected worms should be burned.

VERMIN

FLEAS.—These annoying pests are most troublesome in the nests of sitting hens and layers. They do not live on the birds, as lice do, but hide in the crevices of the walls or perches. Nothing will eradicate them but a frequent and thorough lime-washing, or a spraying of the infested parts with a solution of soft soap, hot water and paraffin. Pyrethrum "insect" powder is useful in the nests when paraffin, an otherwise excellent vermicide, cannot be used lest the eggs should be tainted.

LICE.—There are many varieties of lice which live on the bodies of poultry, the commonest one being a yellowish-brown creature with which most of us are only too familiar. With a good "dust bath" at hand most birds can rid themselves of lice, but it is desirable to renew the "dust," or soil, and to scatter over it a handful of sulphur occasionally. Insect powder may also be used upon each individual bird, getting it well under the feathers. Another remedy is to apply carbolized vaseline in small quantities to different parts of the body, say underneath each wing, at the base of the neck and tail and to the head. A hen that is troubled with lice cannot be really profitable, and it only leads to loss and disappointment to endeavour to hatch eggs and rear chickens with a mother that is infested with these or any other parasites.

THE RED MITE.—This is perhaps the worst of all offenders in the vermin list, for it is a voracious blood-



[*By the courtesy of " The Illustrated Poultry Record"*

POULTRY LICE
(Largely magnified)

sucker, hiding in the crevices of perches and walls by day and coming forth at night to suck the blood of the unfortunate hens. Many honest attempts to make poultry pay have been foiled by the attacks of these pests, which sap the very life of their victims, making it impossible for hens to lay, and reducing chickens to such a condition of weakness that they die from any trivial ailment. As red mites do not live on the birds they can be easily located by day about the perches, and their presence is often betrayed by a fine greyish-white dust which is scattered around their hiding-places. Paraffin is the best means of eradicating them, and if the perches—particularly underneath and at the ends—are swabbed with a brush dipped in the above oil occasionally the pests will soon disappear.

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FEATHER ATTACKED BY LICE

TICKS.—These vermin are most troublesome with young chickens, attaching themselves to the heads of the latter and sucking the blood. When broods are not doing well, or if they appear to be drooping from no apparent cause, the heads of some of the birds should be examined for ticks. The latter are a pale grey colour and are generally found with their heads buried in the chicken's skull or neck; as they are not large, the down must be turned over before they can be observed. If not many birds are affected, the vermin may be picked off individually, but it is usually wisest to apply a little carbolic oil (1 in 40) to the infested parts. Do not use too much, a small drop on the top of the head and the same quantity on one or two places about the upper part of the neck being sufficient. There is no doubt but that ticks and other vermin found on chickens are contracted from the hen, for those broods brought up in foster-mothers are immune from this class of vermin, which is, by the way, a very strong argument in favour of artificial hatching and rearing.

[*By the courtesy of "The Illustrated Poultry Record"*

EGGS OF FOWL LICE ATTACHED TO FEATHER

SOME USEFUL NOTES

PRESERVING EGGS.—The best way to preserve eggs is in water-glass (silicate of soda), which every chemist now sells for the purpose. The usual method of preparing the liquid is as follows: Empty a 1 lb. tin of water-glass into a large galvanized bucket, or other clean vessel, and pour on to it about six quarts of boiling water. Stir the whole until the water-glass is thoroughly dissolved, and when the mixture is cold it is ready for the eggs. These may be put in daily, the greatest care being taken to see that they are clean and perfectly fresh. Do not fill the vessel too full, but allow quite an inch of the liquid to remain above the top layer of eggs. It is better to use several rather small receptacles than one large one, for then the oldest eggs may be used first, which would be impossible were they underneath hundreds of others at the bottom of a large vessel. Water-glass is so cheap, clean, easy to use, and quite the best of all preservatives, that it is useless to describe any other methods.

HOW TO PACK FOWLS FOR MARKET.—When fowls are to be sent to a salesman or retailer in the dead state, the usual method of packing is as follows: Take a flat box, or basket, deep enough to hold two layers of birds. Line this with clean oat straw, or wood wool, and cover it with a sheet of white paper. Lay the fowls breast downwards upon the latter, keeping them close together and packing a little wood wool or paper between them and all round, to keep them in position. Now cover them with another sheet of paper, then a layer of straw, and repeat the process with the next lot. The great point in packing fowls is to make them secure against being shaken about during transit. Pack tightly, filling up all corners right up to the lid. Do not use too much straw—the less the better—consistent with efficiency. Always use white paper, and do not omit to see to the cleanliness and grading mentioned in an earlier chapter. Single fowls, or couples, sent out ready dressed to private customers, travel very nicely in basses, provided they have some soft paper round them, and are stitched in fairly tight. They will go this way either by parcel post or rail.

PACKING EGGS.—There are so many patent egg-boxes on the market now that it would be folly for any one not to adopt one or other for the safe conveyance of his eggs. Even when sending hampers of produce to customers, it is desirable to pack the eggs separately in either wooden or pasteboard boxes.

Eggs should never be sent loose with other things, no matter how carefully they are packed. The best principle, to my mind, in patent egg-boxes, is the ordinary form now in general use, which consists of a box containing layers of compartments, between which a sheet of felt is placed. Eggs should always be stamped by a private mark, as a guarantee of freshness. If, in any case, some soft material should be required to pack eggs, and it is generally necessary when they are being sent out in small boxes, there is nothing to equal cork-dust. It is very light, slightly elastic, has no odour likely to affect the eggs, and can be secured for next to nothing from greengrocers and others who sell foreign grapes. It is far superior to any other packing material.

STANDARD FOR POULTRY AND EGGS.—The Utility Poultry Club has adopted the following Standards for Table Poultry. 1. Size and quality, 25 points; 2. Youth, quantity and quality of breast-meat, 30 points; 3. Straightness of keel, fineness of bone, absence of offal and surplus fat, 25 points; 4. General marketable appearance, colour of skin, etc., 20 points.

THE EGG STANDARD is as follows: Freshness, 40 points; size, 15 points; texture of shell, 15 points; uniformity of size, colour and shape, 15 points.

Eggs to be passed over (in judging) if (1) they rattle in the shell; (2) are double-yoked; (3) contents are tainted in any way; (4) artificially coloured; (5) are polished. In judging freshness the following tests are suggested: Size of air space, density of albumen, firmness of chalazæ, toughness of yolk membrane and roundness of yolk, by freedom and completeness with which contents leave the shell when broken.

AN IRON TONIC.—For fowls that are in low condition, debilitated, and when the yolks of the eggs are pale: Dissolve 1 lb. of sulphate of iron in 1 gal. of water. Add 6 drops of sulphuric acid. When all is dissolved and clear, mix one dessert-spoonful to not less than a pint of water. For chickens, dilute with twice as much water. The latter containing this tonic must not be put in metal vessels.

SULPHUR FOR FOWLS.—When the poultry are moulting, or at any time in hot weather, give them a heaped-up teaspoonful of powdered sulphur with the same quantity of common salt, to every six birds twice a week. This will also be found a great preventative of feather-eating and kindred vices. Sulphur is particularly useful for keeping fowls, which are subjected to close confinement, in health. It may always be given in the soft food.

A CONDITION POWDER, for use during sudden changes of the weather to a lower temperature, or for hens which have roup or colds—

2 oz. aniseed
2 oz. liquorice
6 oz. fenugreek
3 oz. gentian
2 oz. sulphate of iron
3 oz. cayenne

Powder and mix with 1 lb. white thirds, rice flour or fine oatmeal.

Use about a teaspoonful to every half-dozen hens (mixing it with the soft food), and keep in a dry place.

A DRY-FEED FOR CHICKENS.—To two parts groats (or pin-head oatmeal) dari, canary seed, broken wheat, cracked maize and millet, add one part fine, prepared granulated meat, hemp-seed and "kibbled" green (old) peas. Use the mixture after the third or fourth day, always giving it in the litter. It is, however, generally cheaper to buy one's "dry feed" ready mixed.

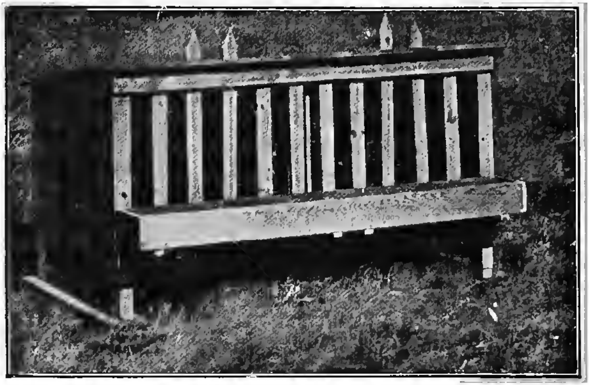
TO WATERPROOF CANVAS.—To rather more than three parts of linseed oil add 1 oz. of sugar of lead and 4 oz. rosin. Grind the sugar of lead in a small quantity of oil, then add the remainder with the rosin. Boil the whole gently for a minute or two, and apply it to the canvas while hot.

TAR.—In using tar as a preservative of woodwork always apply it when hot. It is improved by adding some melted pitch (about 1 lb. of the latter to 1 gallon of the former). Never apply tar or any other preservative to wood that is not thoroughly dry.

POULTRY MANURE.—Keep this in casks or boxes in a dry place. Before using it for general gardening purposes, mix it with about three times its bulk (the quantity must be judged according to the amount of litter the manure already contains) of dry earth or road dust. Apply about eight to ten cwts. per acre. Value 3*s.* 6*d.* to

10*s.* per cwt., according to quality and the purpose for which it is used.

TO CURE FEATHERS.—Always sort out the feathers at the time of plucking, throwing away the quills. Keep white ones apart from coloured ones; they are worth more. Store loosely in paper bags, hanging in a dry place for a few days. The bags must then be placed in a moderate oven three or four times, for about an hour on each occasion, and allowing a day or two to pass between each baking. The feathers will then be sufficiently cured.



MR. TAMLIN'S FATTENING COOP. ALSO USEFUL AS A BROODY COOP

The feathers of waterfowl are worth more than those of hens (the down very much more), and white ones are twice as valuable as coloured. A small piece of camphor in each bag will keep away moth.

A BROODY COOP.—The old-fashioned methods of "curing" broody hens by dipping them in water, or starvation, have been entirely superseded by the more effectual and more humane "broody coop." This is very like an ordinary hen coop, but with this difference, that its bottom is made of rounded strips of wood, placed about two inches apart. The coop is raised on four legs, so that there will be a free circulation of air underneath.

When it is desired to "cure" a hen of broodiness, she (or several) is placed in the coop for two or three days, being fed and watered meanwhile by means of a trough fixed within reach of the front, which latter is made of upright bars of wood.

The advantage of this method over others is that the hens are "cured" of the sitting instinct in a shorter time, and, as they are fed during the process, they come on to lay very much sooner after the operation is over than they would otherwise do. The broody coop should be stood out of doors and, for preference, within sight of the stock which is at liberty.

TABLES FOR POULTRY KEEPERS

Avoirdupois

16 drachms......... = 1 ounce.
16 ounces........... = 1 pound.
14 pounds........... = 1 stone.
28 pounds.......... = 1 quarter.
112 pounds, or 4 qrs. = 1 cwt.
20 hd.wts. (cwts.) = 1 ton.

Land or Square Measure

1 sq. foot = 144 sq. inches.
1 sq. yd.. = 9 sq. ft. = 1296 in.
1 rod, pole, or perch = 30¼ yds. = 272¼ feet.
1 chain = 16 rods = 484 yds. = 4356 feet.
1 rood = 40 rods = 1210 yds. = 10,890 feet.
1 acre = 4 roods = 160 rods = 4840 yds.
Roughly speaking, an acre has four equal sides of 69½ yds.

Dry or Corn Measure

2 pints.............. = 1 quart.
4 quarts............ = 1 gallon.
2 gallons........... = 1 peck.
4 pecks............. = 1 bushel.
2 bushels........... = 1 strike.
4 bushels........... = 1 coomb.
8 bushels........... = 1 qr.
10 quarters....... ... = 1 last.

What Corn should Weigh

Wheat (English)	63	lbs.	imp. bus.
Oats (English)...	42	,,	,,
Barley (English)	56	,,	,,
Buckwheat	52	,,	,,
Maize.............	60	,,	,,
Dari...............	60	,,	,,
Potatoes..........	56	,,	,,
Malt Culms......	41	,,	,,
Bran..............	17	,,	,,
Middlings	32	,,	,,

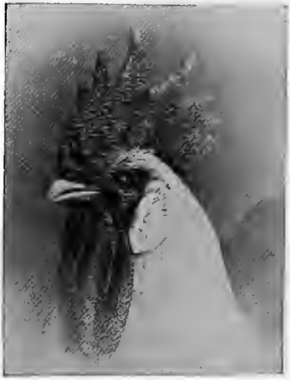
PERIODS OF INCUBATION

Hen	20 to 22 days.	Turkey	28 to 31 days.
Duck	28 to 30 ,,	Guinea fowl	26 to 28 ,,
Goose	28 to 31 ,,	Pea fowl	28 to 30 ,,
Ornamental ducks	26 to 29 ,,	Swan	about 5 wks.

GLOSSARY OF TECHNICAL TERMS USED BY POULTRY KEEPERS

Barred or barring.—The alternate stripes of dark and light across a feather.

Beard.—The tuft of feathers underneath the throat, as in Houdans or Faverolles.



Head of White Leghorn Cockerel

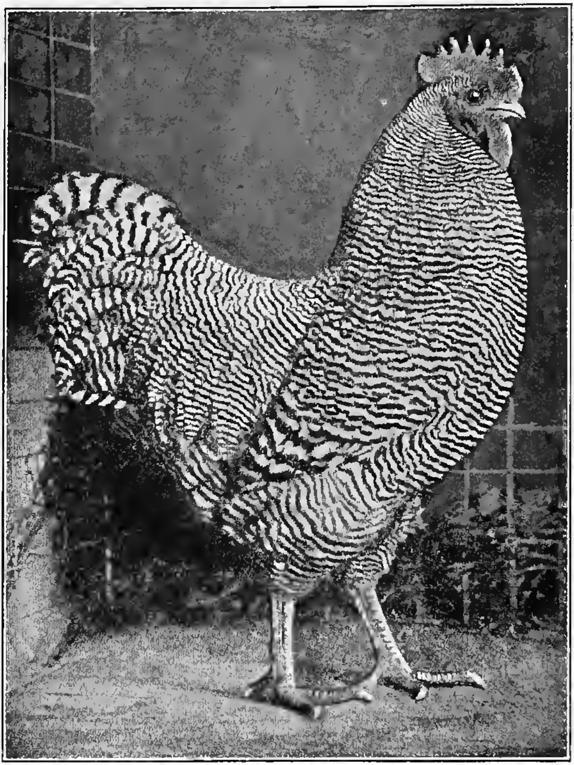
Bred at Quarry Farm, Pool, Leeds, showing comb, wattles, lobes, etc.

Breast.—In a living fowl, the fore part of the body between the keel and the throat; in a dead fowl, for table, the flesh on either side of the keel (*q. v.*).

Breed.—A race of fowls having a distinct character, and including all the varieties (in colour and form) which are found in it.

Brood.—A family of chickens with one hen.

Broody.—A hen that desires to sit.



[*By the courtesy of " The Reliable Poultry Journal "*

PLYMOUTH ROCK COCKEREL

Bred at Pine Top Poultry Farm, Hartland, N.Y., U.S.A. Note the "Barring," "Hackle," "Saddle-hackles,' "Sickles," "Tail Coverts," "Single Comb," and other points.

Caruncles.—The fleshy adornments on the head or neck, as in the turkey.

Chicken.—A term loosely applied to a fowl at any age under one year.

Cockerel.—A cock under twelve months old.

Comb.—The red protuberance on a fowl's head.

Crest.—A "top-knot" or crest of feathers upon the head.

Crop.—A bag-like receptacle that contains the fowl's food immediately it is swallowed.

Cushion.—The round mass of feathers on a hen's back near, and in some cases almost covering, the tail.

Deaf-ears.—Ear-lobes (*q. v.*).

Dubbing.—Removing comb, wattles and lobes, as in Game fowls.

Ear-lobes.—Folds of skin, of various colours, that hang below the true ears.

Face.—The naked skin about the eye.

Flights.—The stiff feathers of the wing, invisible when the wing is at rest.

Fluff.—The downy feathers of the body.

Hackles.—The thin feathers upon the necks of cocks and hens. Saddle-hackles are the feathers growing on the posterior part of a cock's back.

Hock.—The joint between thigh and shank.

Keel.—The breast-bone.

Laced or Lacing.—A striping, or edging, round a feather, usually of a darker shade than the ground-colour.

Leg.—In a "fancy" fowl, the shank or scaly part; in a table bird, that portion hidden by the feathers.

Pea-comb.—A triple comb, as in Brahmas.

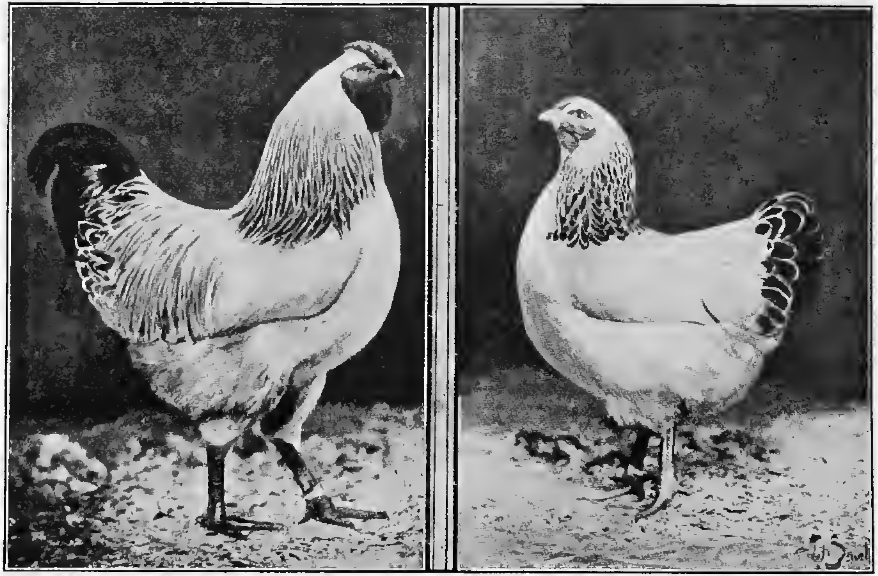
Pencilling.—The striping or marking upon a feather, as in the Partridge Wyandotte hen or Pencilled Hamburgh.

Poult.—A young turkey.

Primaries.—The flight feathers of the wing.

Pullet.—A young hen in her first year.

Rooster.—A cock.



[*By the courtesy of " The Reliable Poultry Journal*

COLUMBIAN WYANDOTTES

Owned by Mr. J. P. Keating, Westboro', Mass. Note the "Rose-comb," "Lacing," "Cushion," and other points

Rose-comb.—A broad comb covered with spikes and tapering to a point at the back, as in Wyandottes and Hamburghs.

Saddle.—That part of a cock's back nearest the tail.

Secondaries.—The stiff feathers of the wing which come next to the flights, or primaries.

Self-colour.—One solid, uniform colour.

Shaft.—The quill of a feather.

Shank.—The scaly part of the leg.

Sickles.—The long curved feathers of a cock's tail.

Spangling.—The splashes or spots of colour on a feather, as in Spangled Hamburghs and Polish.

Spur.—The pointed weapon at the heel of a cock.

Squirrel-tail.—A tail that is held over the back.

Stag.—A young cock. A term used mainly by Game and turkey breeders.

Strain.—A family, or race of fowls, that has been successively bred for one object, and that has acquired an individual character of its own. Most breeds contain many different strains.

Tail-coverts.—The glossy, curved feathers at the foot of the sickles.

Thighs.—The joint above the shanks: the "drumsticks."

Trio.—A cock and two hens.

Variety.—One of the divisions, or parts, of a breed, distinguished by its colour and form.

Vulture-hocks.—Stiff quill feathers projecting backwards from the lower part of the thighs, as in Brahmas.

Wattles.—The red appendages at the base of the beak.

Web.—The web of a feather is the soft part on either side of the quill; the web of the foot, the thin skin stretched between the toes; the web of the wing, the triangular skin that is seen when the part is plucked.

Wing-bar.—The shoulder or upper part of the wing.

Wing-bay.—The three-cornered part of the wing between the wing-bar and the flights, seen when the wing is closed.

Wing-bow.—The shoulder or upper part of the wing.

Wing-butts.—The corners or points of the shoulders, most prominent in Game fowls.

Wing-coverts.—The feathers which cover the quills of the secondaries.

INDEX TO ILLUSTRATIONS

A Happy Family, 59
A Morning Dip, 122
Air Cells in Eggs, 40
Aylesbury Drake and Duck, 124

Brahmas, Light, 133
Broody Coop, 168

Duck Farm, View on Mr. Toovey's, 7
Ducklings on Mr. Milne's Farm, 127

Egg, Abnormal, 19

Fattening Coop, Mr. Tamlin's, 168
Faverolles, Pair of Mr. Bradley's, 134
Feeding Field Layers, 97
,, ,, ,, 105
Foster Mother, Messrs. Cyphers', 47
,, ,, Mr. Payne's, 45
,, ,, Mr. Tamlin's, 49
French Amateur's Yards, A, 87

Houdan Cock (Frontispiece)

Incubator, Messrs. Cyphers', 31
,, Hearson's "Champion," 28
Indian Runner Drake and Duck, 130

Laying House, "U.P.C.," 81
Leghorn Cockerel, White, 137
,, Cock, ,, Head of, 171
,, Hen, ,, 75
Lice, Eggs of, 163
,, Feather attacked by, 162
,, Poultry, 161

Minorca Cock, Head of, 139

Orpington Cock, Buff, 15
,, ,, White, 73
,, Hen, Black, 112
,, ,, White, 11
,, ,, Buff, 68
,, Pullet, Black, 140
,, ,, White, 142

Pekin Drake, 123
Pekins, Trio of Mr. Milne's, 125
Poultry Farm, View of Rev. L. Jones's, 5
,, ,, View on Mr. Toovey's, 71
,, House, A, "Tamlin," 67
,, ,, Payne's "U. P. C.," 81
,, on Pasture, 77
,, Yard, a Small Holder's, 3

Rearing under Difficulties, 53
Rock, Plymouth, Cockerel, 172
,, ,, Hen, 90
Runs, Garden, 85

Scaly-leg, 158
Scratching Shed, 81
Shelter, A Cheap Winter, 103
Sussex Fattening Shed, 114

Testing Eggs, 13
Trap Nest, Mr. Payne's, 74

Wyandotte Black Cock, 110
,, ,, Hen, 57
,, Blue ,, 144
,, Chickens, 63
,, Columbian, 174
,, White Cock and Hen, 23

INDEX TO SUBJECTS

ADDLED EGGS, 40
Air Cell, 19, 40–1
Albumen, 19, 21
Albuminoids, 89, 91, 94
Allantois, 24
Allotments, poultry on, 84
Anaemia, 148
Analysis of foods, 89, 91, 94
Anconas, 72, 132
Andalusians, 132
Animal food, 98
Apoplexy, 148
Artificial incubation, 34–42
,, rearing, 43–55
Aseels, 132
Aylesbury ducks, 124, 129
Aylesbury-Pekin ducks, 129

Balanced diet, A, 91–2
Barley for fattening, 115
,, ,, layers, 93–4
Biscuit-meal, 50, 96
Black Spanish (*see* Spanish), 144
Bone, cut ("Green"), 98, 106
Bone-meal (dry), 64, 156
Book-keeping, 8
Brahmas, 132
Bran for ducks, 122
,, ,, layers, 94–5–6, 100, 103
Breasts, crooked, 113
Breed *v.* Strain, 72–3
Breeding for eggs, 72–5
Breeds for farmers, 72
Bronchitis, 148
Broody coop, 168
,, hens, 168
Bumble-foot, 149
Buttermilk for ducklings, 126
,, ,, poultry, 64, 66, 101, 114, 126

Cage-fattening, 108–9, 113, 115
Canker (*see* Diphtheria and Roup), 151, 157
Canvas, to waterproof, 167
Carbohydrates, 90–1, 94
Catarrh, or cold, 149
Chalazæ, 21
Change of food, 102
Chickens dying in shell, 42
,, feeding, 48, 55, 64
,, grit for, 55
,, management of, when half-fledged, 55, 62–4
,, size of flocks, 48
,, sorting out, 62
,, stock, feeding of, 64
,, table, 65, 108, 120
,, vermin on, 163
,, water for, 54
Cholera, 149
Clover meal, 104
Cochins, 133
Cold, or catarrh, 149
Comb, diseases of, 149, 153, 159
Condiments, 106, 167
Consumption, 150, 159
Coops for broody hens, 168
,, ,, chickens, 60
Cork dust, 165
Coucou-de-Malines, 113
Covered runs, 83–4
Cramp, 150
,, in ducklings, 126
Crève-Cœurs, 113, 134
Croad Langshans, 137
Crooked breasts, 113
Crop-bound, 150
Cross-breeds, 69

Dead in shell, chickens, 42
Diarrhœa (*see* also cholera and enteritis), 151
Diet, balancing a, 91–2
Diphtheria, 151
Diseases, treatment of, 147
Dressing (*see* trussing), 111, 135
Dropping-board, 81, 82–3

Dropsy, 152
Dry-feed, 49–50, 167
Drying-box, 30, 33
Ducks, advantages of liberty for, 121
Ducks, breeds of, 129–131
  ,, farming, 129
  ,, feeding stock, 122
  ,, hatching and brooding, 124
  ,, housing for stock, 123
  ,, mating, 124
Ducklings, age for marketing, 127
  ,, feeding for market, 126
  ,, in gardens, 129
  ,, preparing for market, 128
  ,, rearing, 124–5
Dumpies, (*see* Scotch Dumpies), 143
Dust bath, 58, 82, 160

Early hatching essential, 76
Egg-bound, 152
Egg-eating, 152
Egg-food for chickens, 48–9
Egg, formation and composition of, 18–21
Eggs, airing, 37–8
  ,, chilled during incubation, 39
  ,, foreign, 10–13
  ,, for hatching, care of, 36–7
  ,, ,, ,, selecting, 36
  ,, packing, 165
  ,, preserving, 164
  ,, shell-less or soft-shelled, 20
  ,, testing, 39
  ,, turning, 37–8
Egg trade, 10–14
Embryo, 20, 22, 24, 25
Enteritis, 153
Exercise for layers, 102, 104

Farmers' fowls, 70–79
  ,, ,, feeding, 104
Fasting market poultry, 116
Fattening, advantages of, 16, 110–11
  ,, in cages, 108–9, 113–15
  ,, foods for, 114, 116
  ,, table chickens, 65, 66
Faverolles, 112, 135
Favus, 153
Feather-eating, 154
Feathers, to cure, 168
Feeding chickens, 48–55
  ,, field layers, 104
  ,, laying hens, 100–107
Fleas, 160
Foods, analysis of, 89–91, 94
Foreign eggs, 10, 13
Foster-mother, Payne's, 43, 45
  ,, temperature of, 46–7
Foster-mothers, 43, 44
Fowl hospital, 147
Fowls, farmers', 70–9
  ,, table, fattening and management of, 65–9, 113–16
  ,, in gardens, 84-8
  ,, on grass and arable land, 76–8

Game fowls, 135
Game, Indian, 111, 136
Gapes, 154
Garden runs, 84–6
  ,, ,, for ducklings, 129
Germ of egg, or germ spot, 20
"Going-light," 154, 159
Gout, 155
Grading market poultry, 119
Grains for feeding, 93, 102
Grass-land, fowls on, 76–8
Grass runs, 86–7
"Green" bone, 98, 106
Green food, 50, 96–7
  ,, ,, for ducklings, 125
Grit for adults, 99
  ,, ,, chickens, 55
Groats for chickens, 93
Ground oats, 64, 101, 114, 126

Hamburghs, 135
Hatching, 41
Hens, laying, feeding, 100–7
  ,, old, disposal of, 78–9
Hospital, fowl, 147
Houdan, cock as sire, 69, 72, 112, 113, 136
Houdans, 135
Houses, open-fronted, 80, 82
  ,, size of, 83
Household scraps, 100–1, 102
  ,, flock, feeding, 100–4
Housing ducks, 123
  ,, of poultry, 80–3

Incubation, artificial, 34–42
  ,, periods of, 170

Incubator, Cyphers', 30–1
  ,, Hearson's, 27–30
  ,, rooms, 34–5
  ,, temperature of, 35
Incubators, types of, 26–33
Indian corn (*see* Maize), use and abuse of, 78, 79, 94, 95
Indian Game, 111, 136
  ,, Game-Dorking, 111
Indian Runner ducks, 124, 129, 131
Inflammation of the bowels (*see* Enteritis), 153
Inflammation of the lungs, 156
Insect powder, 58, 160
Iron tonic, 166

Killing market poultry, 116

La Bresse fowls, 113
La Flèche, 136
Lameness (*see* Gout, Leg-weakness, Rheumatism), 155, 156, 157
Lamp, incubator, trimming of, 38
Langshans, 136
Late hatching of layers, evils of, 76
Layers, ducks as, 129, 131
  ,, for farmers, 72
  ,, feeding, 100–7
  ,, on small holdings, 84–8
  ,, selecting best, 74, 76
  ,, time to hatch, 76
Leghorns, 69, 72, 137
Leg-weakness, 156
Lice, 160–1
Lime and Lime-washing, 88, 99
Linseed-meal, 96
Litter for adults, 82
  ,, ,, chickens, 46
Liver disease, 159

Maize (or Indian corn), use and abuse of, 64, 78, 79, 94, 95
Maize-meal, 66, 101, 103
Malays, 138
Manure, poultry, 2, 78, 83, 167
Market, best breeds for, 111, 113
  ,, preparing ducklings for, 128
Marketing chickens, age for, 68, 69
Mashes, various, 103
Meals, various, 103
Meat, 98, 106
  ,, for ducks, 122
Meat-meal, 96
Medicines for poultry, 147–8
Membrane of egg, 19
Middlings, 50, 64, 94, 98, 100–1, 103, 126
Milk for chickens, 49, 51, 65, 68, 116
  ,, ,, ducklings, 126
  ,, sour, 108, 114
Mincing food, necessity for, 101
Minorcas, 138
Mites, Red, 160
Moisture in incubators, 30, 32, 36
Mortar, old, for layers, 99

Nest for sitting hen, 56, 57
Nest, Trap, 74–5

Oatmeal, 48
Oats for ducks, 122
  ,, ,, layers and stock chickens, 64, 93, 102, 104
  ,, ground, 64, 101, 108, 114, 126
Old hens, disposal of, 78–9
Onions for chickens, 50, 154
Open-fronted houses, 80–2
Orpingtons, 69, 72, 111, 140
Ovary, 18
Over-feeding, 100, 104
Oviduct, 19

Packing eggs, 165
  ,, poultry for market, 118–19, 164
Paraffin as an insecticide, 162
Pasture, fowls and, 76–7
Pea-meal for layers, 94, 95, 96
Pekin ducks, 124, 129
Pip, 156
Plucking, 117
Plymouth Rocks, 69, 111, 141
Pneumonia, 156
Polish fowls, 141
Potato for ducklings, 126
  ,, proper use of, as food, 97–8
Poultry, breeds of, 132–145
  ,, Club, 146
  ,, ,, Utility, 166
  ,, diseases of, 147–160
  ,, farming, as a sole pursuit, 1
  ,, ,, an adjunct to agriculture, 2
  ,, ,, capital required, 6

Poultry on farms, value of, 76–7
,, farms, prize, 2
,, for table, 15–17, 108–120
,, ,, ,, breeding, 110, 113
,, keeping on farms, 70–77, 104–6
,, manure, value of and how to use, 167
,, medicines, 147–8
,, packing dead, 164
,, powders, 106–7, 167
Preserving eggs, 164

Quality, importance of, in poultry and eggs, 16, 17, 108–10, 166
Quicklime in houses and runs, 88, 153

Rearing artificially, 43–55
Redcaps, 143
Red-mites, 160
Rheumatism, 157
Rice for chickens, 50, 68
,, ,, ducklings, 126
Rocks, Plymouth, 69, 111, 141
Rouen ducks, 124
Roup, 157
Runner ducks (*see* Indian Runner) 124, 129–31
Runs, concrete or asphalt, 84
,, covered, 83
,, garden, 84, 86
,, purifying foul, 84, 87–8
,, small, grass, 86, 87

Scaly-leg, 158
Scotch Dumpies, 143
,, Greys, 143
Scraps, household, for feeding, 100–101, 102, 126
Scratching exercise for layers, 102, 104
Scratching-sheds, 82, 103, 104
Selection in breeding layers, 74–5
,, ,, breeding table fowl, 113
Shaping dead poultry, 118
Shell for layers, 99
Shell-less eggs, 20
Shelters, 82, 103
Silkie fowls, 144
Singeing dead poultry, 116
Sitting hen, best type of, 56
,, ,, management of, 58, 59, 60
Small holdings, layers on, 84–8
Sour milk, 108, 114
Spanish fowls, Black, 144
Spices, 106, 107, 167
Standards for poultry and eggs, 166
Strain, importance of, 72, 73
Sulphur for fowls (*see also chapter on* Diseases), 107, 166
Surrey fowls, 15, 65, 111
Sussex fowls, 15, 65, 111
,, ground oats, 65

Table poultry, 15, 17, 65–9, 108–20
,, ,, Breeding, 111
Tables (weights and measures), 169
Tar as a preservative, 167
Technical poultry terms, 171–6
Temperature of foster-mother, 46–7
,, ,, incubators, 35
Testing eggs during incubation, 39, 58
Thirds, 50, 98
Ticks, 163
Tonics for poultry, 148, 166
Trap-nest, 74, 75
Trussing, 119
Tuberculosis (liver disease), 159

Unfertile eggs, 40
Utility Poultry Club, 166

Vegetable food, 64, 96–7
,, boiled, 101, 103
Ventilation in coops, 60
,, ,, houses, 80
,, ,, incubators, 36
Vermin, 160

Water for chickens, 54
,, ,, ducklings, 125
Water-glass, 164
Waterproofing canvas, 167
Water supply, importance of, 99
Weights and measures, 169
Wheat, value of, as food, 93
White comb, 159
Worm, Gape, 154, 155
Worms, Parasitic, 159
Wyandottes, 69, 72, 111, 145

Yokohamas, 145
Yolk, 19, 21, 25

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